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JANUARY 2005

MODEL **Airplane** NEWS

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Pittenger 9 FuntanaS 90 3D ARF
Hobby Hobbies C-47 Skytrain
Hobby Hobbies Edge 540T ARF
Hobby Hobbies G-3D Banchee 40

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{BY RICK BELL}

> **ON THE COVER:** our traditional January antique cc image is well-known artist Jo Kotula's rendition of the Supermarine Spitfire, borrowed from our December 1 issue. **ON THIS PAGE:** the Great Planes Profile 38 is a eye-catching, twin-engine scale model; don't miss our review on page 56. (Photo by John Reid.)

NEW YEAR, NEW GEAR

A DECADE AGO, ALMOST-READY-TO-FLY (ARF) MODELS were few and far between; if you wanted to add a new plane to your hangar, you first needed to spend a few months (or more!) in the workshop building and covering the airframe before you could even think about getting your model airborne. Fast-forward to 2005: the hottest airplanes available come expertly built, beautifully covered and radio- and engine-ready. It doesn't get much better than that! This year's new airplanes cover the spectrum, from giant-scale warbirds to electric backyard flyers and 3D aerobats. With so many great airplanes and gear to look forward to, 2005 should be one of the best yet for RC! Check out this month's special 12-page "New for 2005" for our favorite picks for the new year. Remember: you saw it here first!

And speaking of firsts, we're excited to share two exclusives with you this month: the hot XP9303 computer radio from JR and Great Planes' brand-new *RealFlight Generation 3 (G3)* flight simulator. JR's latest offering features fixed-wing, helicopter and sailplane programming and is designed to compete with "pro" computer radios. How is

JR giving modelers a competitive edge? See our in-depth review of this new unit on page 88.

Great Planes' *RealFlight* series of flight simulators has long been favored by pilots who want to hone their skills without risking their airplanes and who want to fly comfortably when they've been grounded by the weather.

The latest version of this popular program, *RealFlight G3*, offers even more realistic scenery, physics, airports and planes for the desktop pilot, and when Great Planes sent us a beta version of *G3*, we were very happy to be able to test it. Catch our sneak peek at this new program on page 40.

Looking for a winter building project? See this issue's bonus, photo-illustrated guide to more than 350 favorite *Model Airplane News* plans. With three-quarters of a century of model designs to choose from, you're certain to find a warbird, backyard flyer, or sport plane that's exactly what you want. For a complete directory and details of all available *Model Airplane News* plans, be certain to visit rcstore.com.

As you browse through this issue, you'll notice that we've updated and redesigned the magazine for a clean, more sophisticated look. We've also improved our flight tests with even more in-depth setup and flight information. To let us know what you think of our new packaging and what you'd like to see more (or less) of, send an email to man@airage.com, or write to us at 100 East Ridge, Ridgefield, CT 06877-4606 USA. We look forward to hearing from you.

Debra Cleghorn



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The cover of your December 2004 issue that features the Thunder Tiger Rare Bear racer was great! I have been a fan of the Rare Bear race team for many years and have followed the racing career of the Bear's chief pilot Lyle Shelton, since the mid-'70s. I have built several models of the Rare Bear; I modified the old Top Flite and Royal Grumman Bearcat kits to produce the Reno racer. I can't wait to get the new one from Thunder Tiger! Thanks for a great first look!

Ricky, our West Coast associate editor John Reid is also a fan of the Bear, and he jumped at the chance to review the one sent to Model Airplane News. This model requires a fair amount of assembly work, but the result is well worth the effort. Having tweaked the

Many of the models available today are referred to as "fun-fly." I think all models are fun to fly, but is there a class of competition out there, such as pattern or scale, that's actually called "fun-fly"? If so, where can I get more information on it? The fun-fly airplanes I read about seem to be very high performance. I'd like to find models that are a bit easier to control.

Ralph, yes; there is a fun-fly aerobatics class, and it is very popular, indeed! The difference between fun-fly and typical aerobatic competi-



tions is that the pilots are judged against time; other aerobatic events are judged according to how well a pilot flies each maneuver. Contrary to what you may think, you don't need a super-high-performance model to get started in fun-fly. What you do need, though, is a rugged, 4-channel model that can do loops, rolls, spins and touch-and-go's. These are the basic

Specifications:
Wing Span: 40.9 inches
Wing Area: 325.5 sq. in.
Flying Weight: 21.1 ounces
Radio Required: 4 channel, 4 micro servos
ESC Required: 12 AMP (KAV4485)
Battery Required: 8 Cell, 600mAh Nicad Pack
Includes "Plug & Fly" 400-size motor, gearbox, APC, prop, and hardware. Order Item #KAV4485



Specifications:
Wing Span: 38.4 inches
Wing Area: 325.5 sq. in.
Flying Weight: 14 ounces
Radio Required: 3 channel, 2 micro servos
ESC Required: 5 Amp (#KAV4483)
Battery Required: 8 Cell, 650 mah Nicad Pack or 8 Cell, 650 mah Ni-MH Pack

Includes "Plug & Fly" prop, and hardware. Order Item #KAV4423



Specifications:
Wing Span: 56.9 inches
Wing Area: 461 sq. in.
Flying Weight: 15.9 ounces
Radio Required: 3 channel, 2 micro servos
ESC Required: 6 Amp (KAV6483)
Battery Required: 8 Cell, 650 mah Nicad Pack
Includes "Plug & Fly" 280-size motor, gearbox, prop, and hardware.
Order Item #KAV521

The KAVAN Cocktail Series is perfect for those after-hours times of relaxation. The BloodyMary ARF is a great first time flyer, while its sister airplane, the BloodyMary Thermal ARF catches thermals like a glider, flies at a walking pace, and may be the finest first-time airplane for no or little wind conditions. Want something with more kick? Try the ScrewDriver ARF. Using a "Plug & Fly" 400-size electric motor and full 4-channel control, it's the perfect step-up model for the seasoned flyer. All of the KAVAN Cocktail Series airplanes are hand built from the finest woods, then expertly covered in genuine Oracover® covering material. See them all at leading hobby retailers.



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maneuvers that make up fun-fly events. The faster you do them, the better your score. The sportsman class is the place to start, and when you become more competitive, you can move on to the expert class! There are several specialized models to choose from, and the best source of information is the National Competition Fun Fly Association (NCFFA) website: ncffafunfly.org.

GY

MACHO MUSTANG

In the October 2004 issue, there is a review of the new Top Flite giant-scale P-51D Mustang ARF. The article gave this model great scores. Now that you've flown the model for a few months, how is it holding up? I am about to buy one of these impressive warbirds, but I want to know more about its staying power and flight performance.

TOMMY FRANKIE [EMAIL]



Tommy, the Top Flite P-51 ARF is still going strong. After flying it several times and taking it to the Warbirds over Delaware giant-scale warbird fly-in (where several other pilots twisted the sticks), the overall opinion of this giant-scale ARF remains very high. Powered by the ZDZ 40 gas engine, the Mustang has excellent flight performance and is one of the nicest high-performance models I have flown. At full power, it really grooves! I did increase the air-inlet area of the cowl to improve engine cooling, but that's all I have done. The Mustang remains a winner.

GY

CHATting WITH THE EXPERTS

Kudos for your "It's Showtime" article in the November 2004 issue! I have often wondered what it would be like to compete at Top Gun or at a Tournament of Champions aerobatic event. The number of years that these master fliers devote to the sport is awe-inspiring. When I see one of them fly, it inspires me to try harder to

improve my flying skills. They can be proud of what they have accomplished. Thanks for the great reporting!

GEORGE CUNNINGHAM [EMAIL]

George, we agree: pilots such as Terry Nitsch, Quique Somenzini, Jason Shulman, Dave Patrick and Len Sabato are great assets to the RC hobby. Whenever the public gets a chance to see them do their stuff, it helps us all. We all benefit from positive PR, and these guys hand it out in spades.

GY

ZIROLI AT-6 TEXAN PLAN

Due to a printing error, the full-size plan of the

AT-6 Texan that appeared in the December 2004 issue was inadvertently reduced to 96 percent. You can either enlarge the existing plan at 104 percent or download the 100-percent version online at modelairplanenews.com. We apologize for any inconvenience. ✚

WRITE TO US! WE WELCOME YOUR COMMENTS AND SUGGESTIONS. LETTERS SHOULD BE ADDRESSED TO "AIRWAVES," MODEL AIRPLANE NEWS, 100 EAST RIDGE, RIDGEFIELD, CT 06877-4606 USA; EMAIL MAN@AIRAGE.COM. LETTERS MAY BE EDITED FOR CLARITY AND BREVITY. WE REGRET THAT, OWING TO THE TREMENDOUS NUMBERS OF LETTERS WE RECEIVE, WE CANNOT RESPOND TO EVERY ONE.

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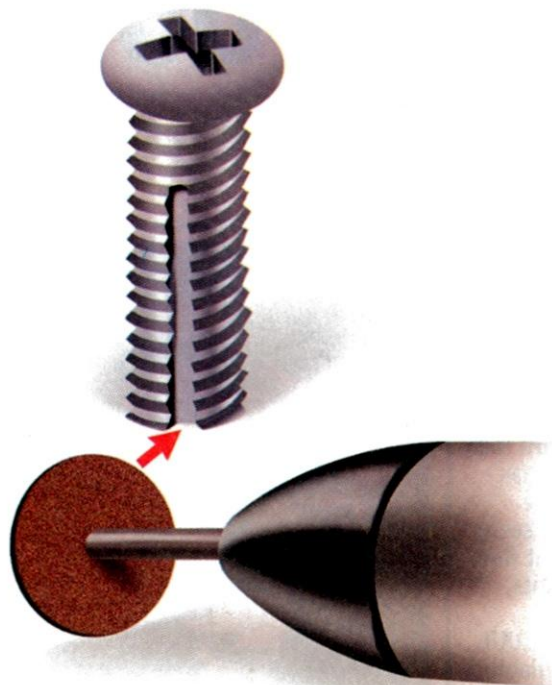
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GETTING BETTER IDEAS OFF THE GROUND

diy self-tapping screw

You'll have an easier time installing screws in hard plastic if you thread the holes with a homemade tapping screw. Using a fine cutoff wheel in your Dremel tool, cut a slot across the threads of a screw of the same thread size and pitch as the one you plan to install. (Safety first: use a vise to hold the screw.) The slot will allow shavings to escape as the screw cuts threads in the plastic. Thread the tapping screw into the part to make threads, and then remove it. Now you're ready to install the correct screw with less strain on your wrist and much less risk of stripping the screw head.

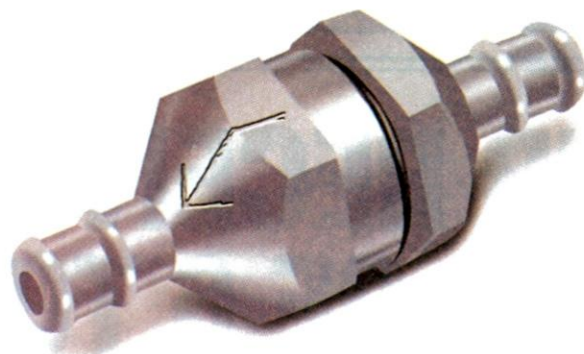
Steve Garcia, Philadelphia, PA



safety tip

Everyone knows that you're always supposed to put the cap back on your hobby knife before you toss it back in your pit box—too bad you lost the cap the same day as you bought the knife. A quick solution is to loosen the blade and then insert it backward in the handle. This will preserve the sharpness of the blade and help you avoid injury when you reach into your flight box.

Bryan Whitney, Santa Clara, CA



flowing filter

It's easy to install a Du-Bro fuel filter backwards if you're not paying attention. If the filter is installed backwards, contaminants will collect on the wrong side of the filter element and can potentially clog the fuel line. Also, if you reinstall a dirty filter backwards, fuel running through the filter will actually carry dirt off the reversed filter and into the carb. To avoid this, use a hobby knife to scribe an arrow on the aluminum casing to indicate the proper direction. Remember that the O-ring should be at the rear of the filter case. For greater visibility, you can fill in the scratched-on arrow with a permanent marker.

Peter Martin, Smithfield, RI



greasy plug

Installing a new glow plug can be a real pain if the gasket keeps falling off. To hold the gasket in place, dab a tiny bit of grease or a drop of after-run oil onto the gasket.

Matt Teeter, Boston, MA ✦

SEND IN YOUR IDEAS. Model Airplane News will give a free, one-year subscription (or a one-year renewal, if you already subscribe) for each idea used in "Tips & Tricks." Send a rough sketch to Model Airplane News, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE THAT YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can neither acknowledge each one nor return unused material.



GRAND-PRIZE WINNER

>L-1049 Lockheed Super Constellation

B.B. Weber

Houston, TX

When it came time for us to choose our latest "Pilot Projects" grand-prize winner, the 2004 entries were among the toughest ever for us to sort through. After intense deliberation, however, we agreed on one standout that could not be overlooked: B.B. Weber's scratch-built rendition of a KLM "Connie" from Don Smith plans. "The Flying Dutchman" has a 132-inch wingspan and a 122-inch-long fuselage. This 52-pound aircraft is powered by four O.S. .91 FS 4-stroke engines and has an all-Futaba radio system; Robart retracts, wheels and brakes by Charlie Stevens; Tru-Turn spinners; and 3-blade, 14x7 props from Graupner. B.B. says, "It flies perfectly," and that's easy to believe. For his originality and painstaking craftsmanship, we're proud to name B.B. our 2004 "Pilot Projects" grand-prize winner. A check for \$500, a one-year subscription and a *Model Airplane News* T-shirt are on their way. Terrific job, B.B., and congratulations!

HONORABLE MENTION

B-25 Mitchell Gene Baguley

Apple Valley, CA

We can't forget to praise this beautiful B-25. Gene sent us this photo of his "new baby"—a North American B-25 Mitchell that he scratch-built using Royal Plans. Weighing 11 pounds with a 71-inch wingspan, the model replicates a PBJ-1H Navy version. Finished in Coverite and painted with 21st Century paints, this amazingly detailed model features hand-made guns, pilot and tail gunner. Thank you, Gene, for your efforts; a one-year subscription and a *Model Airplane News* T-shirt are in the mail.



HONORABLE MENTION

>Short Sunderland Mk III Robert B. Slanton Sr.

Independence, MO

As you know, we are huge fans of originality, and Robert's Short Sunderland Mk III is just that—original. This impressive aircraft took Robert more than 1,500 hours to build! He scratch-built the WW II flying boat from Palmer Plans; readers may remember it from the Toledo RC Expo earlier this year. The 1/12-scale model has a 112-inch wingspan and weighs 40 pounds. It features navigation, cabin and landing lights and is powered by four Evolution engines. The creator of this standout model deserves a one-year subscription and a *Model Airplane News* T-shirt, so keep a close eye on your mailbox, Robert!



> Bell P-63A King Cobra

William J. Herrmann, Summerville, SC

Check out this giant-scale model! It has an 8-foot wingspan and an 87-inch-long fuselage, and William powers it with a Moki 2.10 engine, which he has cleverly mounted in the scale location—behind the pilot! William also directed the airflow from the fuselage scoop and wing scoops to the engine compartment. He created a vent on the center-box bottom so the air could exit during the engine's cooling process. He also constructed this model with working cockpit doors, retracts and wheel doors. It took William two years to gather the information and build the King Cobra.



> deHavilland Caribou, STOL

Ronald L. Wilson, Harrington, DE

Ronald scratch-built his Caribou using only a 3-view computer print-out—no plans! His model has a wingspan of 78 inches, is 52 inches long and weighs 11¾ pounds. Ronald installed twin O.S. .46LA engines with Master Airscrew props to power his model. He also uses a Futaba 6-channel radio, which controls all 11 servos. Other cool features include spring-loaded retracts and navigation and landing lights that are controlled by the flap's angles. Very impressive!



> Stearman PT-17

Bill Hunter, Ormond Beach, FL

With a wingspan of 65 inches and a weight of 8 pounds 6 ounces, this Sterling Stearman is just one of Bill's beautiful models. With Bill's name printed across the Stearman's side, there's no mistaking who owns this plane. It's difficult to miss its eye-catching finish, as well. Inspired by Sammy Manson's aerobatic Stearman of the 1950s, Bill used Sig Coverall and LustreKote paint for the model's finish. He powers this beauty with a vintage Enya .60 and a JR radio. Bravo, Bill!



> Super Chipmunk

David Wright, Chanute, KS

David was very excited to build his Super Chipmunk with a slight alteration; he had always seen it with a red, white and blue paint scheme. Although these are great patriotic colors for the Chipmunk, David envisioned a vibrant yellow-and-black design topped with the Pennzoil logo, and he accomplished this with MonoKote. He powers his Chipmunk with a Magnum .90 4-cycle engine, and he boasts, "It flies very well and looks good in the air, too!" ✈

SEND IN YOUR SNAPSHOTS. *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable, but please do not send digital printouts or Polaroid prints. Emailed submissions must be at least 300dpi. We receive so many photographs that we are unable to return them. All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in! Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

WHAT'S NEW FOR 2005

A SPECIAL, 12-PAGE "AIR SCOOP"

COME ALIVE IN '05! With so many great new airplanes and terrific new RC gear, you won't be able to sit still for long in the new year. We herewith present the latest and greatest releases—all the new stuff we're most excited about—in this special, 12-page version of "Air Scoop." Remember: you saw it here first!



►VMAR F4 Phantom II ARF

This new plane offers symmetrical plug-in wings, fully covered all-wood construction, metal spinner, detailed cockpit and pinned hinges, and it's retract-ready. Revolutionary new covering techniques create a great color scheme along with rivets and panel lines that you can feel. Available in U.S. Navy (silver) and USAF (camouflage) colors. Specifications: wingspan—58.5 in.; wing area—910 sq. in.; length—63 in.; weight—9.75 to 10.25 lb.; engine—.60 to .91 2-stroke. Price—\$299.95.

VMAR; distributed by Richmond RC Supply (877) 727-2329; (604) 940-1066; richmondrc.com.

►price pick

►SPORTSMAN AVIATION F4U Corsair ARF

Sportsman Aviation has set a new standard in ARF construction with its latest iteration of this classic warbird. This beautiful Corsair comes with rotating retracts, a factory-painted fiberglass cowl and a complete hardware kit including a dummy radial engine. Specifications: wingspan—58.25 in.; wing area—618 sq. in.; length—45.25 in.; weight—6.17 lb.; engine—.52 to .61 2-stroke or .70 4-stroke; price—\$219.99.

Sportsman Aviation; distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.

►high flyer

►MODEL TECH Twister 3D ARF

This new aerobatic machine can do 3D and freestyle maneuvers with ease. Its advanced aerobatic platform allows this plane to perform smooth pattern maneuvers yet still be flexible enough to perform Harriers and Blenders. The kit also includes a fiberglass cowl, aluminum landing gear, a clear canopy and extensive hardware. This is one plane that you'll be able to twist and shout about! Specifications: wingspan—55 in.; wing area—585 sq. in.; length—58 in.; weight—6 to 7.65 lb.; price—\$149.99.

Model Tech; distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.



➤ GREAT PLANES MODEL MFG. Matt Chapman CAP 580

This world-famous CAP 580 has the same unique color scheme as the full-size Matt Chapman CAP 580. This ARF features a standout trim scheme with factory-applied Top Flite MonoKote covering and matching fiberglass cowl and wheel pants. Kit includes heavy-duty hardware, pilot figure, wheels and spinner. Specifications: wingspan—99.5 in.; wing area—1,885 sq. in.; length—95 in.; weight—29 to 32 lb.; engine—4.2 to 7.2ci glow or gas.

Great Planes Model Mfg.; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; greatplanes.com.



➤ FUTABA 9C Super Radios

The new 9C super radios still have the same easy programming, switches and dials, but they now offer more memory, more functions and greater flexibility, as well as an expanded 18-model memory and a three-function timer that can be programmed to any switch using a countdown or count-up timer mode that can even be set up on the throttle stick to provide accurate timekeeping. These radios are available with and without servos and with a variety of servo configurations. Street prices range from \$379.99 to \$999.99, depending on configuration.

Futaba Corp. of America; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; futaba-rc.com.



➤tech wow

➤E-FLITE Tensor Profile

3D electrics is one of the hottest trends in RC right now, and the E-flite Tensor is a great way to get involved in this exciting category. Its laser-cut-foam construction (supported by carbon-fiber rods) produces the strength and light weight necessary for the most extreme aerobatics, indoors and out. The struts are essentially vertical wings, and they give the Tensor the lift it needs to fly knife-edge at dramatically slower speeds than most models.

E-flite; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.



➤park favorite

WHAT'S NEW FOR 2005

>GWS

3D Tiger Moth 350

One of the best flying airplanes from GWS is the Tiger Moth, and the new 3D Tiger Moth retains all of the great qualities associated with the original; now, however, it comes with a powerful motor and oversize control surfaces.

Designed for experienced fliers, the 3D Tiger Moth 350 is constructed of foam and includes painted parts for quick assembly time.

Specifications: wingspan—31.5 in.; wing area—409 sq. in.; length—26.6 in.; weight—11.3 to 14.8 oz.; power system—EPS-350/DS; price—\$56.

GWS USA (909) 594-GWS9; gws.com.tw.



>price pick

>HELI-MAX

RotoFly

This 4-channel helicopter comes fully assembled; you need only add eight AA batteries! The included training gear and DVD ensure your complete success. The RotoFly comes with a 2-cell, 600mAh Li-poly battery and charger for 10-minute flights.

Six canopy colors are available, and it costs \$280.

Heli-Max; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; greatplanes.com.



>HOBBY LOBBY

Bu-133 Jungmeister

This accurate scale model of the pre-WW II German training plane is a perfect match for the Actro brushless motor. It features a gelcoated fuselage and built-up balsa wings that are ready for covering. ABS detail parts, cycle fenders, scale cylinders, scale exhaust, seat and instrument panel add to its scale appearance.

Specs: wingspan—43.5 in.; length—40 in.; wing area—548 sq. in.; weight—81 oz. The Bucker Jungmeister costs \$299.

Hobby Lobby Intl. (615) 373-1444; hobby-lobby.com.



>SIG MFG.

Kadet EP-42 ARF

The latest addition to the Kadet line, the EP-42 makes a great first aircraft—big enough for stability but small enough for the convenience of electric power. Designed to be quick to assemble, durable and easy to fly, the Kadet EP-42 ARF shares all the characteristics that have made its larger siblings the favorite models of first-timers. Features include a quick-change battery hatch, a high-lift, oversize wing and a powerful Super 400 motor system.

Sig Mfg. Co. Inc. (800) 247-5008; (641) 623-5154; sigmfg.com.



>SIG MFG. Edge 540T ARF

The 33-percent Edge 540T is Sig's ultimate giant-scale aerobat. Its 100-inch wingspan and 1,881 square inches of wing area give it spectacular flying characteristics. It is designed to use gas power from 5.8 to 6.8ci. The plane's construction is first rate; it uses all laser-cut balsa and ply parts, and it's hand-assembled.

Sig Mfg. Co. Inc. (800) 247-5008; (641) 623-5154; sigmfg.com.



>high flyer

>DYMOND MODELSPORTS USA LTD. Sub-micro Servos

Dymond Modelports has introduced three new sub-micro-servo designs. The latest is the Dymond D47; this 4.7-gram servo has a completely new motor system that produces 21 oz.-in. of torque while maintaining a high-resolution movement. This servo is a great addition to Dymond's arsenal of sub-micro servos, including the D44 (4.4 grams) and D54 (5.4 grams). Price: \$24.95.

Dymond Modelports USA Ltd. (858) 495-0092; rc-dymond.com.



>ICARE Plettenberg Orbit Xtra

This new series of outrunner brushless motors offers huge power for electric F3A pattern airplanes and big helicopters, and they're made to the same high standards—and with the same materials—as Plettenberg's world-class contest motors. With three bearings and balanced components, the Orbit Xtra is virtually vibration-free. It costs \$439.

Icare (450) 449-9094; icare.com.



>WATTAGE Micro Flyer

The revolutionary new Micro Flyer is small, quick and responsive. This incredibly light plane (it weighs about 1 ounce) can be flown indoors and out. The plane is powered by a high-performance, 150mAh, 1-cell Li-poly battery. The hand transmitter requires six AA batteries and has a built-in charger for the Li-poly. Three buttons on the transmitter control full left and full right rudder along with a button that turns the motor power on and off. This plane is very quick in the air and easy to control; it's a blast to fly.

Specifications: wingspan—9 in.; wing area—29.25 sq. in.; length—8.2 in.; weight—1 oz.; price—\$39.99 (RTF).

WattAge; distributed by Global Hobby Distributors (714) 963-0329; watt-age.globalhobby.com.



>tech wow

>THUNDER TIGER Super Cub EP

This backyard flyer is as easy to fly as it is to assemble. The new Super Cub EP gives excellent high-wing stability that is perfect for the first-time flier. This factory-finished kit comes with fuselage, wings, tail surfaces, motor, spinner and landing gear. Push-n-lock wing joiner, landing gear and control horns make the Super Cub EP a snap to assemble. Specifications: wingspan—39.85 in.; wing area—66 sq. in.; length—26.5 in.; weight—16.5 oz.

Thunder Tiger; distributed by Ace Hobby Distributors (949) 833-0088; acehobby.com.



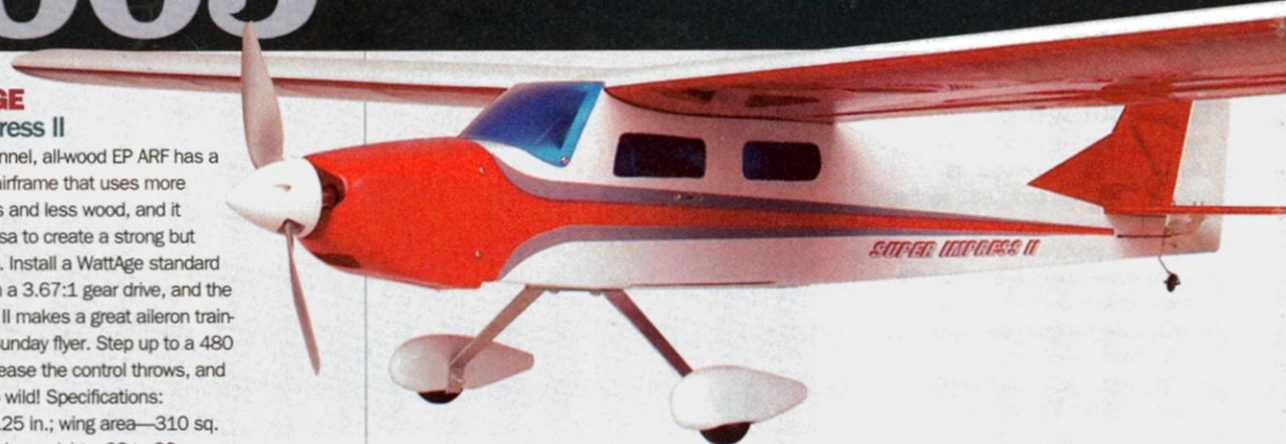
>park favorite

WHAT'S NEW FOR 2005

➤WATTAGE Super Impress II

This new 4-channel, all-wood EP ARF has a re-engineered airframe that uses more lightening holes and less wood, and it substitutes balsa to create a strong but lighter airframe. Install a WattAge standard 370 motor with a 3.67:1 gear drive, and the Super Impress II makes a great aileron trainer or an easy Sunday flyer. Step up to a 480 brushless, increase the control throws, and go from mild to wild! Specifications: wingspan—44.25 in.; wing area—310 sq. in.; length—32 in.; weight—23 to 29 oz.; power system—brushless 480 motor (performance setup); price—\$89.99.

WattAge; distributed by Global Hobby Distributors (714) 963-0329; watt-age.globalhobby.com.



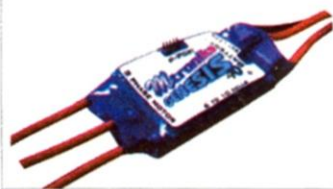
➤park favorite

➤M-TRONIKS Genesis 18, 30 and 40 brushless ESCs

A new generation of sensorless brushless ESCs is now available at an incredibly low price. These brushless controllers feature fully programmable battery selection, timing, prop acceleration and brakes. Other features include a "return-to-base" software-upgrade capability and Li-poly battery support for 2 to 4 cells. They're completely sensorless and can work with almost any brushless motor.

Price: \$75.99 (18A); \$90.99 (30A); \$119.99 (40A).

M-Troniks; distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.



➤MODEL TECH Formula 3D ARF

The new Formula 3D ARF provides performance that's found in much larger 3D aircraft; but it fits inside your car! This plane can do it all, from Rolling Harriers to Blenders and torque rolls—everything you need to look like a world-class pilot. It's covered in a five-color scheme with a fiberglass cowl and aluminum landing gear. Specifications: wingspan—60 in.; wing area—1,027 sq. in.; length—64 in.; weight—6.1 to 7.65 lb.; engine—.40 to .46 2-stroke or .61 to .70 4-stroke; price—\$179.99.

Model Tech; distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.



➤high flyer

➤SPORTSMAN AVIATION Corby Starlet 70 ARF

This scale beauty is an all-wood ARF designed by Chris White (Australian aerobatic champion). This unique-looking plane flies well with a Magnum XL-70RFS (or any motor of similar size) and a 4-channel radio with five servos. The kit also includes a fiberglass finished cowl, wheel pants and a clear plastic canopy along with an extensive hardware package—everything you'll need to get flying within hours of opening the box. Specifications: wingspan—60.75 in.; wing area—730 sq. in.; weight—6.5 to 7.5 lb.; engine—.52 to .71 2-stroke or .61 to .70 4-stroke; price—\$199.99.

Sportsman Aviation; distributed by Global Hobby Distributors (714) 963-0329; globalhobby.com.





➤CARL GOLDBERG PRODUCTS
Skylark 56 Mark II and Sr. Falcon ARFs

Now you can fly two of the most popular trainers around without spending a lot of time at the building table. The Skylark 56 Mark II ARF has been engineered from the blueprints of this popular 1978 trainer kit. The Sr. Falcon ARF is a new version of the history-making kit that flew across America. Skylark ARF specifications: wingspan—56 in.; wing area—558 sq. in.; length—47.75 in.; weight—5 to 6 lb.; engine—.40 to .46 2-stroke glow; price—\$174.99. Sr. Falcon ARF specs: wingspan—69 in.; wing area—810 sq. in.; length—53 in.; weight—6 to 7 lb.; engine—.40 to .46 2-stroke glow; price—\$184.99.

Carl Goldberg Products Ltd.
 (678) 450-0085; carlgoldbergproducts.com.

➤FMA DIRECT

Kokam 502 Li-Po Charger

This multi-feature unit can charge up to 5 Li-poly and 12 Ni-Cd/NiMH cells in series; it features six current settings. Its proprietary circuitry differentiates among Li-poly cells that are in various states of charge, thus preventing an incorrect cell count. Built-in circuitry prevents damage to the charger if the cells, packs, or power source are incorrectly connected to the input or output terminals or if the output terminals are shorted. The 502 Li-Po costs \$99.95.

FMA Direct (800) 343-2934; fmadirect.com.

➤tech wow



➤EXPERIMENTAL AIRCRAFT MODELS

Europa XS

This 60-inch-span replica of the popular British homebuilt will stand out at any flying field. This ARF can be powered by a .40 to .51 2-stroke and has a full-flying stabilizer, a unique nosewheel fairing, tapered plug-in wings and a removable canopy. It's a graceful and responsive flyer. It features white Oracover covering and Du-Bro and Sullivan add-ins.

Experimental Aircraft Models (800) 297-1707; rchomebuilts.com.



➤HOBBICO

Hobbistar 60 Select RTF

Here is a plane that offers the stability of a trainer with the agility to perform basic aerobatics. This ready-to-fly (RTF) airplane comes fully equipped with the best components and is powered by a .65 LA sport engine from O.S.; start your flying career with a plane that's easy to see in the sky and requires only a screwdriver, pliers and 20 minutes to get it airborne! The Hobbistar 60 Select is also available as an ARF for those fliers who already own a radio. Specifications: wingspan—71 in.; wing area—875 sq. in.; length—55 in.; weight—7.5 to 8.5 lb.; engine—O.S. .65 LA (included); price—\$429.99 (RTF), \$159.99 (ARF).

Hobbico; distributed by Great Planes Model Distributors (217) 398-6300; (800) 682-8948; hobbico.com.



WHAT'S NEW FOR 2005

>VIBE 90 3D

When it comes to aerobatics, helis give up nothing to their fixed-wing siblings. And if you're looking to get into 3D in a big way, what better way than with the JR Vibe 90? A development of the championship-winning Vigor platform, it includes carbon frames and fins, a hardened main shaft and a one-piece, CNC 3D center hub with O-ring dampeners. In other words, it has the hardware to take pretty much anything you care to throw at it and master any maneuver you care to throw it into.

JR; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.



>high flyer

>HIROBO XRB Sky Robo

This RC version of the popular XRB Mini Lama comes with a 4-channel FM transmitter, a receiver, a speed control, an adjustable gyro, a 2-cell, 720mAh Li-poly battery pack and an AC charger. Also included are three extra sets of main rotor blades, basic tools and a blade balancer. This ready-to-fly package costs \$350.

Hirobo; distributed by MRC (732) 225-6360; modelrectifier.com.



>AIRTRONICS Micro Digital Wing Servo

Airtronics now offers a high-quality, durable Micro Digital Wing Servo for today's demanding park flyers. The new 91761Z Micro Digital Wing Servo offers great torque with fast response time, and it fits in a small wing opening. Specs: weight—0.8 oz.; dimensions—1.06x0.47x1.18 in.; torque—55 oz.-in. @ 4.8 volts/66 oz.-in. @ 6 volts.

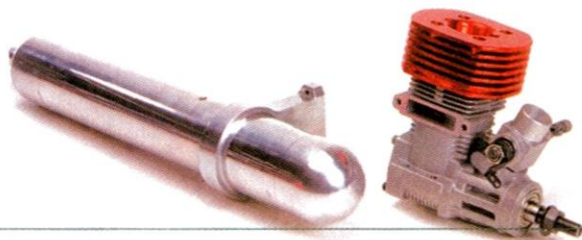
Airtronics (714) 978-1895; airtronics.net.



>TOKI 40H Engine

This .40 engine is the first in a brand-new line of engines from Shuwa Industries. It's the size of a standard .30, so it will fit into all .30-size helicopters and accepts mufflers that fit other .32- to .39-size engines. To maximize this engine's potential, a special muffler is also available separately or with the engine in a special package. The engine costs \$139.99; the muffler is \$39.98; and the combo is \$175.

Toki; distributed by MRC (732) 225-6360; modelrectifier.com.



>ACE R/C Sky Commander 4FD

The new Sky Commander 4FD from Ace R/C has one of the most advanced ergonomic designs of any 4-channel transmitter. It's a fully FM digital-proportional radio that has low battery alarm, servo-reversing switches, end-point adjustment for throttle, aileron and elevator dual rates, digital-trim levers and mixing functions for V-tail and elevon. This radio comes with transmitter, 7-channel receiver, four S1903 STD servos, a rechargeable battery pack, switch harness and charger.

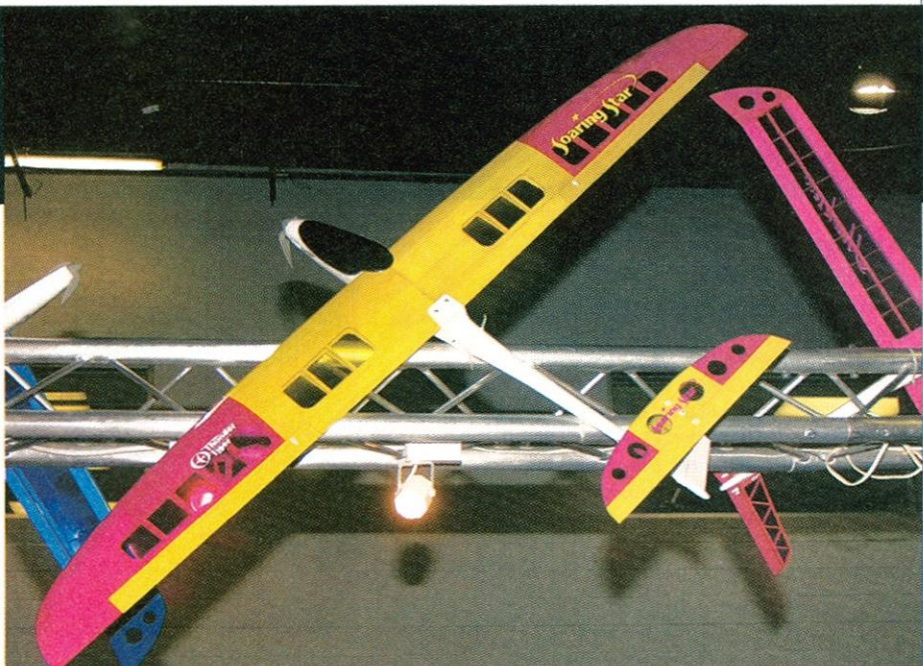
Ace R/C; distributed by Ace Hobby Distributors (949) 833-0088; acehobby.com.



THUNDER TIGER Soaring Star

Thunder Tiger presents a fantastic way to shoot into the world of hot-liner soaring: its new Soaring Star. This new release comes with a gelcoated fiberglass fuselage, dual aileron servos and removable main wings and tail. This beautiful UltraCote-covered plane includes a 540 motor with an 8x4.5 folding prop. Specifications: wingspan—78.75 in.; wing area—532 sq. in.; length—41.25 in.; weight—50 to 52 oz.

Thunder Tiger; distributed by Ace Hobby Distributors (949) 833-0088; acehobby.com.



HOBBY LOBBY Mini 3D

If you're new to 3D, this ARF model's predictable flight performance will help you learn. It comes with wire landing gear, wheels, hinges and hardware, and it's designed for use with two aileron servos so that you can program flaperons for even tighter loops. Specs: wingspan—32 in.; length—33 in.; wing area—352 sq. in.; weight—21 oz. The Mini 3D costs \$69.

Hobby Lobby Intl. (615) 373-1444; hobby-lobby.com.



DU-BRO New Fillin' Station & E/Z Glo

We've shown you Du-Bro's Fillin' Station kits before; now, there is a version for metal fuel cans. Just like the original version, the Can model comes with a fuel pump, a cap fitting, silicone fuel tubing, a bracket with built-in tool holders and aluminum glow-plug holders. It's available with and without a glow-plug igniter and a 4-way wrench.

Speaking of glow igniters, Du-Bro has a beauty in its new E/Z Glo. This unit has a built-in, button-activated tester function that beeps to notify the user whether the plug is good or needs to be replaced. It comes with a 1700mAh Ni-Cd and a charger. **Du-Bro Products** (800) 848-9411; dubro.com.



price picks

MEGATECH Freedom Flyer RTF

Now you can fly anywhere with the New Freedom Flyer RTF from Megatech! This new, 4-channel park flyer comes with radio, battery and charger, and it's capable of ground takeoffs. Its stable design makes it a great plane for first-timeers; its durable, high-density Dura-Plax construction means that this plane can take a bounce! The Freedom Flyer requires only 10 minutes to go from box to flying field. The radio system includes microsensors, an ESC and a micro-receiver that can be used in other RC aircraft.

Megatech Intl. (201) 662-2800; megatech.com.



park favorite

WHAT'S NEW FOR 2005

>VMAR

.90-size Texan & Harvard

VMAR now offers two new, larger versions of the very successful Texan II and Harvard II .45- to .60-size ARFs. Both feature the same great detail as you've come to expect from VMAR, such as two pilots, cockpit and exterior graphics and a set of three scale gear struts. Available in four color schemes, all retract-ready (Robart's are recommended). Specifications: wingspan—81 in.; wing area—996 sq. in.; length—64 to 66 in.; weight—10 lb.; engine—.90 to 120 2-stroke; price—\$299.98.

VMAR; distributed by Richmond RC Supply (877) 727-2329 or (604) 940-1066; richmondrc.com.



>POLK'S HOBBY

Tracker 3

Now available is the new Tracker 3 from Polk's Hobby. This new 8-channel radio will work with any FM receiver and is available for aircraft or surface frequencies. The ergonomic case has all the switches and buttons within easy reach for relaxed, safe flying. Features include 99-model memory, seven 2-way mixes, dual rates on slaves and a built-in frequency scanner. It comes complete with a Seeker II receiver for only \$350.

Polk's Hobby (973) 351-9700; polkshobby.com.



>tech wow

>FLYING STYRO

Stuka Ju-87 D-1

With a painted-foam fuselage, wheel pants, canopy, guns, exhaust stacks and bomb, this 34.5-inch-span warbird has details to please any scale enthusiast. It also comes with four bottles of touch-up paint, waterslide decals and functional landing gear and wheels. The 15-ounce plane has optional rudder control and is available in two versions: "standard" green Luftwaffe camo (\$139) and winter white camo (\$129).

Flying Styro; distributed by Hobby Lobby Intl. (615) 373-1444; hobbylobby.com.



>BME AIRCRAFT

CAP Maniac

This .90-size aerobatic ARF offers outstanding performance and can be converted to electric for extreme 3D maneuvers. It comes with all hardware and has a 60-inch wingspan, 750 square inches of wing area and a 56-inch fuselage. It weighs 6.5 to 7.5 pounds.

BME Aircraft; distributed by Hardsilk Marketing Service Ltd.; bmeaircraft.com.

>high flyer





>DUMAS

L-19 Birdog & WACO ARF

Designed for GWS electric power, these new kits feature the same high-quality parts as we've come to expect from Dumas Products. The L-19 (right, above) has a 40-inch wingspan; the WACO ARF (right, below) has a 35-inch top-wing span. These models are equally at home flying indoors and out.

Dumas Products (800) 458-2828; dumasproducts.com.

>KONDOR MODEL PRODUCTS

Blender ARF

Assembled of hand-selected, laser-cut balsa and covered in UltraCote, this 34-inch-span aerobat will offer outstanding 3D performance when powered by a brushless motor. It's extremely lightweight and has wide airfoil and large control surfaces for the ultimate in maneuverability. It costs \$129.

Kondor Model Products (888) 761-0500; (253) 859-7788; kmp.ca.



>SUPER KRAFT

Pro-Fly 3D Electric ARF

Super Kraft introduces a new electric ARF especially designed for today's high-tech RC equipment. With a brushless motor, it will provide unlimited 3D performance. The Pro-Fly 3D electric ARF is easy to set up and is constructed of high-quality materials. This plane flies great indoors or at the field; it's one plane you will love to fly. Specifications: wingspan—35 in.; length—33 in.; weight—20.8 oz.; price—\$99.77.

Super Kraft; distributed by Kangke Industrial USA Inc. (877) 203-2377; (631) 274-3058; kangkeusa.com.

>park favorite

>HITEC

HS-5955 TG Servo

It's difficult to imagine a job that Hitec's new HS-5955 TG couldn't handle. With 333 oz.-in. of torque at 6 volts from its high-performance coreless motor, it is an absolute powerhouse. And, it's tough; the TG in the name stands for titanium gear, and that means it's both light and as indestructible as a servo can be.

Hitec RCD Inc. (858) 748-6948; hitecrd.com.



>tech wow



WHAT'S NEW FOR 2005

>PARKZONE Super Decathlon

The ParkZone line from Horizon Hobby combines the ease of true, ready-to-fly aircraft with more sophisticated designs. The latest is the Super Decathlon—a 35.5-inch, high-wing, scale plane with a geared 370 motor and 3-channel control. It comes with the proportional speed control and all radio gear installed, and a 7-cell NiMH battery and charger are included.

ParkZone; distributed by Horizon Hobby Inc. (800) 338-4639; parkzone.com.



>park favorite

>HOBBYZONE Firebird Scout

Over the last few years, Horizon Hobby's HobbyZone Firebird series has redefined the entry-level, ready-to-fly market with durable, easy-to-fly airplanes that come complete with everything you need. The Scout follows this trend; it offers everything from batteries to a charger to a video CD with detailed instructions for first-time fliers. A two-mode control setup (Basic and Expert) changes the control responsiveness to suit the pilot's ability level.

HobbyZone; distributed by Horizon Hobby Inc. (800) 338-4639; hobbyzonesports.com.



>FLITON USA Quiet Storm

This electric aerobatic ARF is designed to impress. With all-balsa construction and Oracover covering, the Quiet Storm comes with molded plastic landing gear, a clear canopy, painted cowl and wheel pants and all hardware. It's ideal for F3A maneuvers. Specs: wingspan—43.22 in.; length—40 in.; weight—20.5 oz.

Fliton (949) 378-8015; fliton.com.

>high flyer



>MEGATECH House-Fly

Flying a micro helicopter just got easier with this little 4-channel model. It comes ready to fly out of the box and features counter-rotating main blades, weighted Gyrofly stabilizing bars and a 720mAh Li-poly battery and charger. It costs \$270.

Megatech (201) 662-2800; megatech.com.



WHAT'S NEW FOR 2005

> **SUPER KRAFT** Extra 300L 35%

The new Super Kraft Extra 300L's high-quality materials and workmanship result in an airframe that's light and strong. Constructed of balsa and light plywood, this scale plane will perform with precision yet is still able to jump into an extreme 3D performance when you want it to. Specifications: wingspan—106 in.; length—96 in.; weight—25 to 28 lb.; engine—.80cc to 100cc gas; price—\$899.97.

Super Kraft; distributed by Kangke Industrial USA Inc. (877) 203-2377; (631) 274-3058; kangkeusa.com.

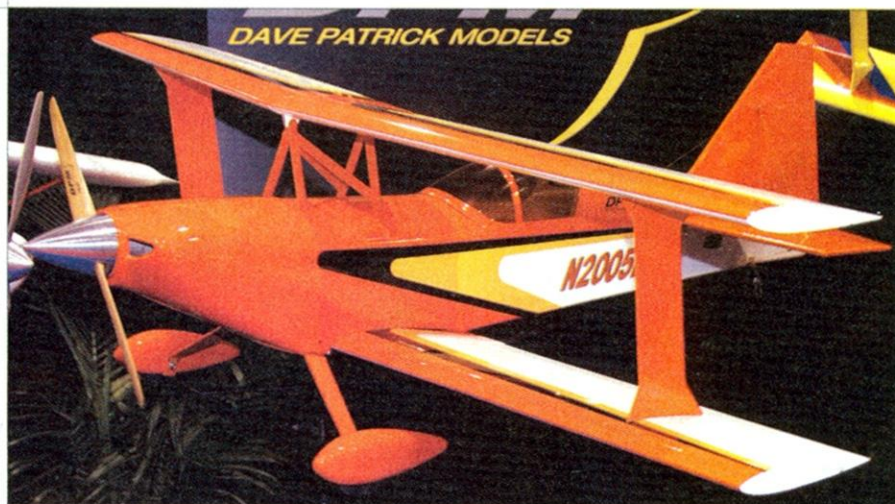


> **high flyer**

> **DAVE PATRICK MODELS** 30% Ultimate

The latest in Dave Patrick's lineup, this giant aerobat features the same high-quality construction and parts we've come to expect from this company. With a 70.5-inch top wingspan and 2.10-size glow or 50cc gas engine in its nose, this Ultimate certainly lives up to its name. Price: \$700.

Dave Patrick Models (815) 457-3128; davepatrickmodels.com.



> **high flyer**

> **CERMARK** Brushless Hover package

This new package comes complete with everything you need (except the battery) to fly your plane on the deck in full hover with more than enough power for vertical pullout. The Hover package includes a CEM-600BL-2 brushless motor, an MEC Superbox 5:1 gearbox with pinion and prop adapter, a laser-cut former, a Phoenix 45 ESC and a 16x8 APC E-prop. The package costs only \$249.99.

Cermark (562) 906-0808; cermark.com.



> **price pick**

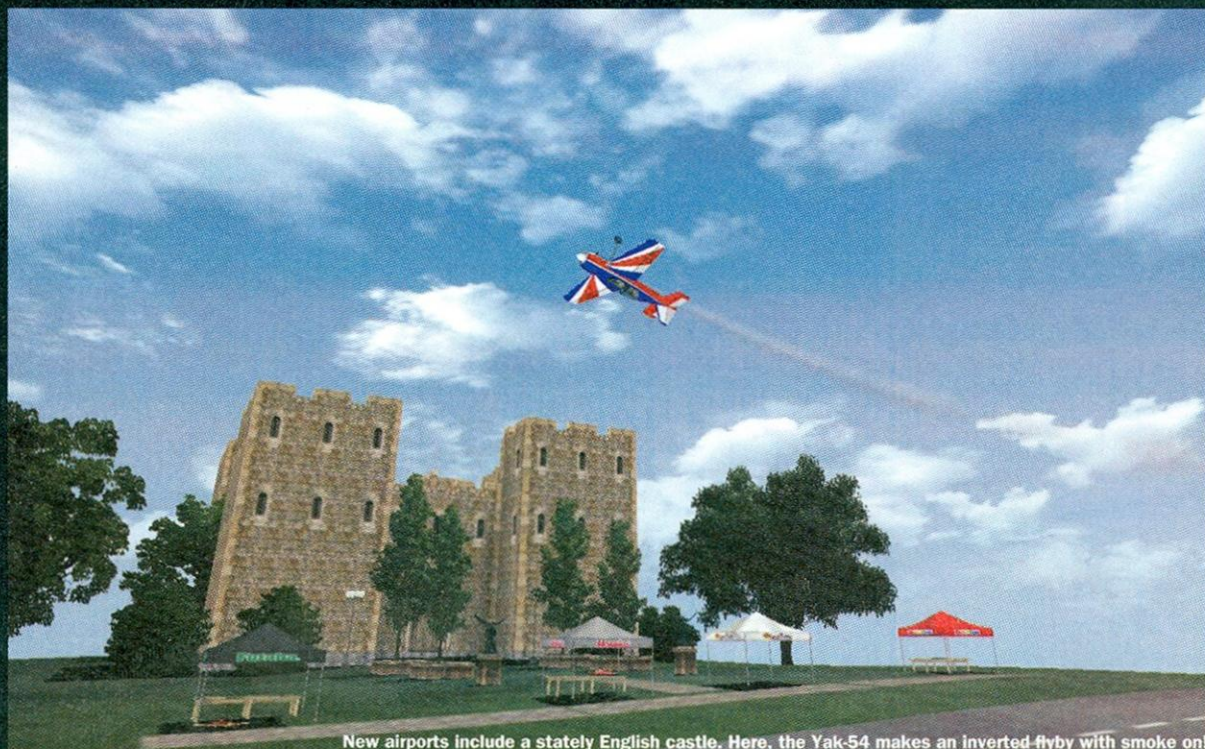
> **TESTORS** Pactra R/C Aircraft Finish

The new Pactra R/C Aircraft Finishes are specially formulated for electric aircraft and are perfect for foam park flyers. Here is a great way to either spray or brush on your camouflage paint scheme and make your aircraft different from everyone else's! These acrylic paints are available in 30 popular WW II and modern aircraft colors. Check them out at your local hobby retailer.

Testor Corp. (815) 962-6654; (800) TESTORS; testors.com. ✦



EXCLUSIVE FIRST LOOK!



New airports include a stately English castle. Here, the Yak-54 makes an inverted flyby with smoke on!

GREAT PLANES REALFLIGHT GENERATION 3

WORKING HERE AT MODEL AIRPLANE NEWS

certainly has its advantages—especially when it comes to new products. We are often the only magazine to get a prototype or beta version of a product to evaluate before it goes into production and hits the market. We had heard some buzz about the improvements to *Generation 3 (G3)* of the *RealFlight* RC Flight Simulator, and we were eager to check out the beta version that Great Planes sent us for our assessment.

SEEING IS BELIEVING

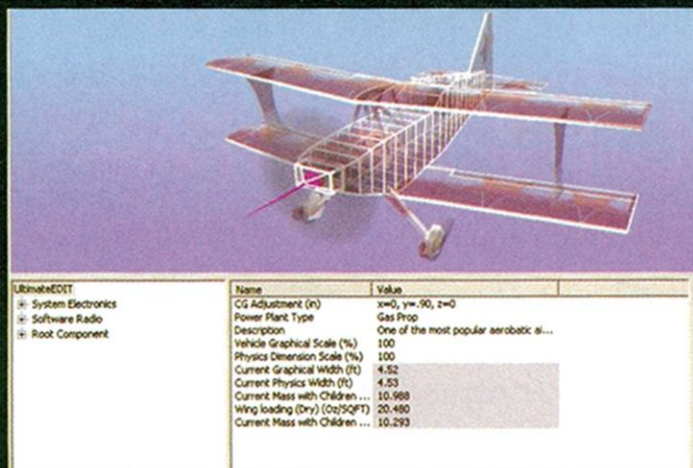
We all know that capturing the true feel of model airplanes in flight is a programming challenge, and over the past few years, *RealFlight* has led the pack in this arena. After we logged a couple of hours on G3, we could see that the programming folks have been busy refining the flying experience. The new RealPhysics 3D is more realistic. The models are smoother in flight, and the feel is better than ever. Now, tackling high-alpha 3D maneuvers such as harriers, waterfalls, blenders and hovering feel the same as they do when you're flying your model at the flying field. Program in a few wind variables, and the only thing missing is the engine's exhaust smell. One of the hottest models at the field today is the Yak-54, and *RealFlight* G3 has captured it to a T. Doing 3D maneuvers with this model is very inspiring and will help build your confidence on the sticks. Just be careful of sun glare reflecting off the aircraft!

ON LOCATION

The new airports are also pretty cool. Want to fly at a stately English castle or at Joe's Garage? Or do you want to design your own flying site? With *RealFlight*, all of these—and more—are possible. The airfields are created using hundreds of megabytes of satellite imagery and digital elevation data, and the effect is totally convincing. One thing that I found to be fun and challenging was slope

A SNEAK PEEK AT THE LATEST FLIGHT SIMULATOR

BY THE MODEL AIRPLANE NEWS CREW



The Airplane Editor features a wire-frame rendition of the model you're working on.



Hungry? Need a quick fill-up? Then Joe's Garage is the place to land.



Want to soar to new heights? The Buena Vista airport is made for slope-soaring, and the new Hawk glider completes the sense of carefree soaring.

“We've barely scratched the surface of the G3, as there is much, much more!”

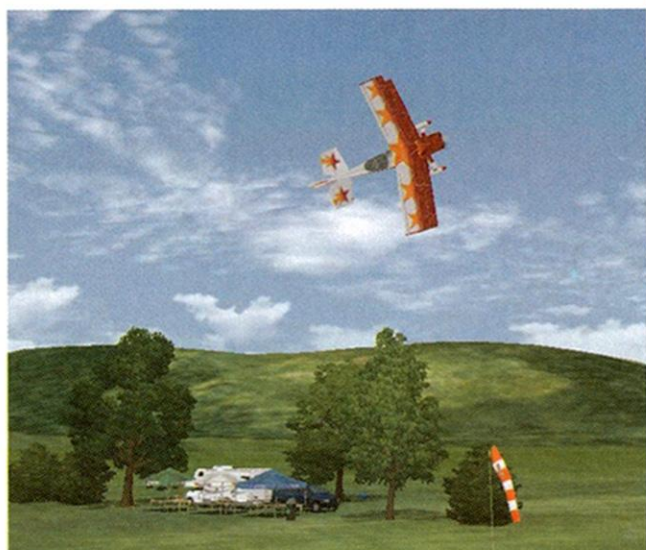
soaring. The Buena Vista “field” is at the top of a small peak, and I found it very exciting to soar with some of the newest models. The neatest of the bunch has to be the Hawk; this bird-like glider soars and reacts nicely to wind variations. As the wind collides with trees and uneven terrain, its strength varies accordingly, and the aircraft shows that it feels the lift of the rising air as it approaches the top of a hill. I was able to ride thermals to high altitudes, and if I wasn't careful, I fell out of the thermal and lost lift.

FINAL THOUGHTS

We've barely scratched the surface of the G3, as there is much, much more to this new flight simulator. In addition to the 5,000 square miles of flying area that have been added, new models range from park flyers to 3D aerobats, slope soarers and gliders. The Aircraft Editor has been enhanced and provides many variables that you can change. The modifications are graphically represented on a wire-frame model and reflected instantly onscreen.

Now that we've had a taste of the G3 beta version, we can't wait to get our hands on the full-blown program. At less than \$200, *RealFlight Generation 3* is sure to be on every pilot's wish list. Stay tuned for a full review soon! ✈

Addresses are listed alphabetically in the Source Guide on page 174.



The VFI Airport offers wide-open space for practicing new maneuvers without distractions.



Save on select Futaba systems at these participating dealers!

Alabama

Bryan's Hobby Shop
Dothan, AL
334-793-2439

Hobbytown USA
Auburn, AL
334-826-8216

Hobbytown USA
Hoover, AL
251-633-8446

Hobbytown USA
Huntsville, AL
256-971-5080

Hobbytown USA
Mobile, AL
251-633-8446

Homewood Toy & Hobby
Homewood, AL
205-879-3986

MAC Hobbies
Tuscaloosa, AL
205-247-5555

Pyramid Hobbies
Cullman, AL
256-739-6679

R/C Hobbies
Huntsville, AL
256-539-1347

Alaska

Anchorage House of Hobbies #2
Anchorage, AK
907-277-7778

Hobbycraft Inc
Anchorage, AK
907-349-5815

Arizona

Adventure Hobbies
Chandler, AZ
480-722-9365

D & D Hobbies
Mesa, AZ
480-981-7709

Frank's Hobby House
Phoenix, AZ
602-992-3495

Hobby Bench
43rd Ave & Bell Road
Glendale, AZ
602-547-1828

Hobby Bench
Paradise Valley Mall
Phoenix, AZ
602-996-7200

Hobby Bench
19th Ave & Northern
Phoenix, AZ
602-995-1755

Hobby Bench
Frontier Village
Prescott, AZ
928-776-1535

Arkansas

Advanced Hobbies
Monticello, AR
870-367-5200

Mark's Hobby Shop
Little Rock, AR
501-296-9956

Modeltronics Hobby Traders
Van Buren, AR
479-410-2863

R/C Hobbies
Jonesboro, AR
870-933-0479

California

Big Boys Toys
Arroyo Grande, CA
805-481-1476

Big Boys Toys
Santa Maria, CA
805-349-1133

D & J Hobby
Campbell, CA
408-379-1696

Dollhouses, Trains & More
Novato, CA
415-883-0388

Helicopter World
San Jose, CA
408-451-1155

Hobbytown USA
Concord, CA
925-685-3802

Hobbytown USA
Fresno, CA
559-435-3342

Hobbytown USA
Newark, CA
510-796-2744

Hobbytown USA
Rocklin, CA
916-315-8199

Hobby Central
Poway, CA
858-513-0373

Hobby Headquarters
Atascadero, CA
805-462-2512

Hobby Warehouse
Lakewood, CA
562-531-3006

Marty's Hobbies
Thousand Oaks, CA
805-497-3664

Modesto Hobby & Crafts
Modesto, CA
209-529-7310

Pegasus Hobby
Montclair, CA
909-982-6507

Pit Stop R/C Hobbies
Santa Barbara, CA
805-898-3902

R/C Country Hobbies
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“Both the Sunday flier and the ‘HOT-DOG’ PILOT LOOKING TO PUSH THE 3D ENVELOPE will enjoy the FuntanaS’s flight characteristics.”



HANGAR 9
FuntanaS 9

PHOTOS BY JOHN REID > MICHAEL STROUP



3D aerobatics at its best!

WE SHOULD ALL THANK SEBASTIANO SYLVESTRI for the fine job he did designing the FuntanaS 90! He calculated just the right amount of wing area, tail moment, control-surface size and weight. Just as he did with its smaller brother, the FuntanaS 40, Sebastiano designed this larger version exclusively for Hangar 9.

The first thing you will say when opening the box is "Holy cow! I'll be able to finish this plane in just a few hours." The level of completeness of this almost-ready-to-fly aerobat is topnotch.

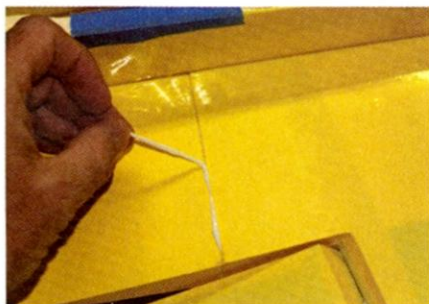
0 3D ARIE



ASSEMBLY

➤ **Wing** Assembly for most ARF models begins with the wing, and the FuntanaS is no exception. I will caution you to carefully inspect all the ribs in each wing panel. Mine had several that were cracked between the lightening holes (probably caused during shipping). I simply dripped a few drops of Zap thin CA onto the cracked ribs. Be sure to carefully check the rib adjacent to the aileron servo mount; if this rib separates, the servo mount will be compromised, and control will suffer.

After I hinged the ailerons to the wing panels, I sealed the hinge gap before adding the control horns; it's a lot easier to add the



I applied a coat of carnauba wax adjacent to the fairings' bonding surface and was able to easily peel off the excess epoxy before it had fully cured.

seal without having to work around the horns. Also, be careful not to allow a thick buildup of CA to develop on the hinges between the ailerons and wing; this would eventually cause a hinge failure.

When I hooked up the aileron linkages, I didn't use the supplied pushrods; the clevises were sloppy on the threads, so I used hardware that I had on hand. The hole for the wing-retaining nylon bolt in the fuselage was slightly off location. I needed to enlarge it about 1/32 inch. After I had fitted the wing, I aligned and glued the wing fillets to the trailing edge. I applied a coat of carnauba wax adjacent to the bonding surfaces on the fuselage for easier removal of the excess Z-Poxy that oozes out. I let the epoxy cure to a rubber state and then peeled it off.

➤ **Tail feathers** Next, I installed the horizontal stab. Before doing this, I thought that it would be easier to work on the model with the landing gear installed. When trimming the covering film from the center section of the stab, be careful not to cut into the underlying balsa. I used 30-minute epoxy to secure the stab.

Next, install the stab carbon-fiber support rods. I fitted them but waited until after I had installed the rudder/elevator servos and



The painted fiberglass wheel pants fit neatly over the wheel's axle. I used two 4-40 blind nuts and bolts to secure the pants to the aluminum landing gear.

SPECIFICATIONS

FUNTANAS 90 3D ARF
 MANUFACTURER: Hangar 9
 DISTRIBUTOR: Horizon Hobby Inc.
 TYPE: 3D aerobatic ARF
 LENGTH: 68.5 in.
 WINGSPAN: 69.5 in.
 WING AREA: 1,108 sq. in.
 AIRFOIL: symmetrical
 WEIGHT: 8.6 lb.
 WING LOADING: 17.55 oz./sq. ft.
 ENGINE REQ'D: .61 to 1.00 2-stroke or .91 to 1.00 4-stroke
 RADIO REQ'D: 4-channel w 6/servos (rudder, elevator, throttle and 2 aileron)
 PRICE: \$209.99

COMMENTS

The FuntanaS 90 is a very capable 3D ARF. The kit includes all the hardware, but I had to replace the aileron pushrods. Both the Sunday flier and the "hot-dog" pilot looking to push the 3D envelope will enjoy the FuntanaS's flight characteristics.

pushrods. The carbon-fiber rods get in the way when you put in the servos and linkages. The next step is to glue the vertical fin and then the tailwheel assembly. Hinging the rudder and elevators is very straightforward and goes quickly. To make the three little holes for the control horns in the control surfaces, I used a drill press. This ensures alignment between the horn and the nut plate on the opposite side of the control surface. After I had installed the servos, I verified that extreme downward deflection of the elevator would not interfere with the rudder control horn.

➤ **Final details** The next steps cover the installation of the fuel system and engine. The supplied fuel tank is large enough to allow at least a 10-minute flight. I used a 3-line system with the Saito 100 to ease filling the tank. Keep the location of the tank in mind when you drill the hole for the throttle-pushrod outer tube; you don't want to puncture the tank! The manual clearly shows how to neatly install the engine and trim the cowl. After the engine has been fitted, install the throttle pushrod

HIGHLIGHTS

- Unique design
- Well-thought-out instruction manual and drawings
- Excellent flight qualities

HANGAR 9 FUNTANAS 90 3D ARF



IN THE AIR

For all flights, the Saito 100, Powermaster YS 20/20 fuel and APC 16x4W prop performed beautifully in combination. When I properly primed the engine, it typically started on one flip.

CONTROL THROWS

Aileron: +3.75 in. -4 in. (high); +2 in. -2 in. (low); expo: 35%

Elevator: +5 in. -5 in. (high); +1.75 in. -1.75 in. (low); expo: 30%

Rudder: +4.5 in. -4.5 in. (high); +4.5 in. -4.5 in. (low); expo: 40%

GENERAL FLIGHT CHARACTERISTICS

Stability: slow-speed and high-speed neutral stability are awesome, thanks to the tapered constant-thickness airfoil.

Control response: the very large control surfaces give the Funtanas unbelievable control authority, even at very low speeds. The light construction also contributes to its no-holds-barred performance.

Tracking: you would typically fly this plane at low power settings and not very fast. It also has very light wing loading; it will bounce around a bit if the air is choppy.

Aerobatics: the Funtanas 90 is an extreme 3D aerobatic airplane with extreme

potential for performing the most creative 3D moves.

Glide performance: this plane is so light that you might become impatient as you wait for it to glide in on a landing.

Stall characteristics: this is one of the most stall-resistant planes I have flown; it just keeps slowing down and pitching nose-up.

PILOT DEBRIEFING

The Funtanas 90 is one of the most enjoyable planes I have flown! It is intended as an all-out 3D flyer and has one of the fastest roll rates I have experienced. Doing rolling harriers with high-rate aileron can be a challenge if your elevator and rudder servos are not fast enough to keep up. There is a bit of yaw-induced coupling in roll and pitch. Due to the long tail moment, some pitch-intensive maneuvers are a bit impaired (e.g., waterfalls). The wing is very tolerant of high-angle-of-attack conditions that make it resistant to snap-roll maneuvers. I had difficulty getting it to do two snaps on a vertical upline. I got the best snaps during knife-edge flight due, I suppose, to the already high yaw condition of knife-edge flight. I anticipate keeping the Funtanas for a long time; it's simply the best bang-for-your-buck aerobatic ARF there is!

and servo. I bonded the throttle-pushrod outer tube to the bottom of the fiberglass wing tube in the fuselage. The height of the throttle servo will determine whether this works for you. Now install the tank, pad

the sides with foam, and secure it from the back with a brace across the fuselage.

When you have fitted and trimmed the cowl, glue the canopy into place. Then place the receiver and battery in the fuselage to achieve the proper CG. The instructions indicate a measurement of $7\frac{1}{8}$ inches from the wing's leading edge with an empty tank, and this actually was a good starting point. After I had secured the radio gear, I checked that the controls moved freely and in the proper directions. The recommended control throws worked well for the first flights. I was ready to put the Funtanas through its paces!

CONCLUSION

The Hangar 9 Funtanas 90 is hands-down the finest model I've ever assembled; you get a lot of model for the price. The flight qualities will make you want to buy two of them so you'll always have one ready to go. Two thumbs up for the Funtanas 90 3D ARF! ⬆

Addresses are listed alphabetically in the Source Guide on page 174.

TEST GEAR

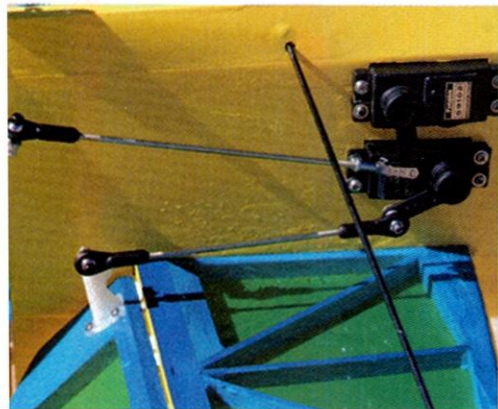
RADIO EQUIPMENT USED

Futaba 9Z transmitter,
3 S9102 servos,
3 S3004 servos, R149DP
PCM receiver

ENGINE USED: Saito
FA-100 GK 4-stroke

FUEL USED: Powermaster
YS 20/20

PROPS USED: APC 16x4W



The rudder and elevator servos are mounted on the rear of the fuselage. Note the elevator's extreme angle that's necessary for 3D flying.



“The Profile 38
is an eye-catcher
at the field and
A REAL THRILL
TO PILOT.”



GREAT PLANES

Profile 38



Scale looks, twin sound, profile ease!

GREAT PLANES KITS ARE DESIGNED AND MANUFACTURED to give modelers a successful building and flying experience. This is evident in the quality of the kit materials, the innovative design and the attention to detail in the building instructions and full-size drawings. The Profile 38 kit is no exception and attains the high standards that modelers have come to expect from Great Planes.

IN THE BOX

The kit features die-cut balsa and light plywood parts, ABS canopy and radiator housings and a generous hardware package. An excellent 47-page instruction manual that is loaded with building tips and flying information, two full-size drawings and a sheet of self-adhesive decals are also included.

CONSTRUCTION

Major assemblies The horizontal stabilizers, rudders and elevator are built on the plans out of balsa sticks and die-cut balsa pieces that I laminated together with thick CA for strength. Most of the balsa sticks can be cut directly over the plans with a sharp hobby knife.

The wing is built in halves and has a semisymmetrical airfoil, and it's also built directly over the plans. Individual die-cut wing ribs are glued to a basswood spar and a lite-ply sub-trailing edge. Once the parts are in position, insert a die-cut plywood shear webbing through holes in the ribs and rotate it to lock it into place. When the structure is assembled, apply CA to all the joints, epoxy the landing-gear blocks into place, attach the wingtip plywood pieces and sheet the bottom of the wing panels. Join the left and right wing panels on a flat surface with three die-cut plywood jigs; just follow the instructions, and you'll find that assembly is a breeze.

Before you completely sheet the top of the wing, install the throttle torque-rod assembly. This clever feature allows the throttle arm on each carburetor to be controlled by one throttle servo to save weight and expense. When you install the throttle torque-rod assembly, you must slot the plywood sheeting on the bottom of the wing to allow the torque rods to exit. Keep the slots small; you can enlarge them when you set

up the radio later.

Booms and vertical stabilizers The booms and vertical stabilizers are sheeted balsa assemblies that you build on the plans. Here again, cut most of the balsa sticks directly over the plans so they fit precisely with the die-cut parts.

Now it's time to choose the engines. Keep in mind that the instruction manual states that if an engine quits in flight, the model will maintain altitude if you use .25 engines, but it cannot maintain altitude on one .15 engine. The kit comes with plywood engine mounts that fit most engines with displacements ranging from .15 to .25 cubic inches. I used two O.S. .25 LA engines, and I am very pleased with the model's performance. I had to add 3 ounces of lead to the tail for the model to balance within the recommended range.

Take your time fitting the booms to the wing and positioning the horizontal stabilizer between them. Before you glue them, make sure that all of the pieces fit together precisely; the booms should be parallel to each other and perpendicular to the building surface. Although the instruction manual directs you to glue the booms to the wing and the horizontal stabilizer to the booms in one step, I felt that this was too challenging and increased the likelihood of a misalignment that might jeopardize flight characteristics. Instead, I first glued the booms to the wing and then attached the horizontal stabilizer after I had secured the booms.

Canopy The next step is to build the canopy frame and fit the upper and lower ABS canopy halves. Once the frame has been assembled (it builds quickly, if you use thin CA), fit and epoxy it to the top of the wing. The frame provides a firm struc-

SPECIFICATIONS

PROFILE 38

MANUFACTURER: Great Planes Model Mfg.

TYPE: sport-scale twin

WINGSPAN: 50 in.

WING AREA: 416 sq. in.

AIRFOIL: semisymmetrical

WEIGHT: 5 lb. 4 oz.

WING LOADING: 29.1 oz./sq. ft.

LENGTH: 36 3/4 in.

ENGINES REQ'D: 2 .15 to .25 2-strokes

RADIO REQ'D: 4-channel w/6 standard

servos (rudder, elevator, throttle, nosewheel steering and 2 for the ailerons)

PRICE: \$99.99

COMMENTS

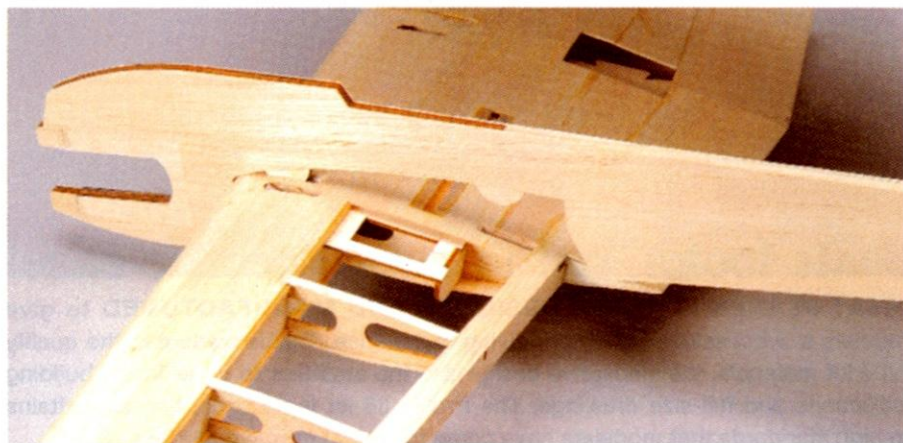
The Profile 38 is a high-quality kit that you can get in the air quickly. The innovative throttle linkage makes setting up the two engines easy. The Profile 38 is a definite eye-catcher at the field and a real thrill to pilot.

ture for attaching the ABS parts and the throttle servo and nosewheel steering servo. When trimming the upper and lower canopies, leave plenty of excess material for final fitting. Temporarily install the nosewheel assembly, the throttle servo and nosewheel steering servo and linkages. Fit and tape the upper canopy to the top of the wing, and check for clearance between all the moving parts. With the upper canopy securely taped into place, trim the lower canopy to ensure a good fit.

Control surfaces When the airframe is complete, attach the control surfaces and the engines and then install the radio gear. Since this plane uses one servo for nosewheel steering and another for the rudders, I connected them with a Y-harness. If you use a computer radio, you can use separate channels and slave the steering to the rudder.

Because the carburetors are linked to a common torque rod, you have to adjust the linkages until the carburetors open and close uniformly. This will also make fine-tuning and synchronizing the engines easier. Take your time setting up the carburetor linkages.

Now laterally balance your model. A laterally balanced model will fly truer through



The model's construction is simple and goes quickly. Note how the profile fuselage has tabs that mate with the wing.

HIGHLIGHTS

- Unique design
- Well-thought-out instructions
- Builds quickly



IN THE AIR

I powered my Profile 38 with two O.S. .25 LA engines, Powermaster 15-percent nitro fuel and Master Airscrew 9x4 props. This is a powerful combination that makes the model perform! I took the time to synchronize my engines, and it really paid off; flights have been problem-free.

CONTROL THROWS

Aileron: $\pm \frac{3}{8}$ in. (high); $\pm \frac{1}{4}$ in. (low); expo 35%

Elevator: $\pm \frac{3}{8}$ in. (high); $\pm \frac{1}{4}$ in. (low); expo 35%

Rudder: $\pm \frac{5}{8}$ in. (high); $\pm \frac{1}{2}$ in. (low); expo 35%

GENERAL FLIGHT CHARACTERISTICS

Stability: with properly synchronized engines, ground-handling stability is solid. Once airborne, the Profile 38 is quite stable throughout all throttle settings.

Control response: at the recommended low- and high-rate settings, aileron and rudder response is crisp. Elevator response is a bit sluggish at both settings. To improve its responsiveness, move the center of gravity (CG) aft (within the recommended range).

Tracking: tracking characteristics are predictable and consistent for sport flying. Looping and rolling maneuvers can be flown on straight lines with minimal rudder input.

Aerobatics: the Profile 38 can do scale-like aerobatic maneuvers with ease.

It does loops, rolls, inverted flight, stall turns and outside loops.

Glide performance: at very low power settings, the Profile 38 loses altitude quickly but predictably. During landings, keep power up to prevent the nose from dropping until just before touchdown.

Stall characteristics: stalls are gentle, and it recovers easily, but practice these maneuvers with plenty of altitude.

PILOT DEBRIEFING

The Profile 38 has good ground-handling characteristics and no tendency to tip. Takeoffs proved to be very easy; the twin O.S. engines produced more than enough power to swiftly lift the Profile 38. While landing, the model has a tendency to drop its nose a bit just before touchdown. To counter this, I keep the speed up on the landing approach. It took only a little practice to make landings simple and smooth. Slow-speed performance was predictable. I didn't detect any snap-rolling tendencies. I wouldn't recommend any extremely slow flights; the added element of having one engine turning at a different rpm could quickly cause a problem. At full throttle, the Profile 38 really scoots along. The plane does scale-like maneuvers such as loops (which can be quite large), rolls and inverted flight easily. It can also do stall turns and outside loops. So far, my snap rolls look more like barrel rolls, but they're still fun to do. Best of all, the twin engines make a sweet sound as the model barrels across the field with the throttles wide open.

basic maneuvers. My model required 2.5 ounces of weight at the outermost rib of the left wing panel.

Final steps Assemble the ABS radiator housings; they are used to cover the servos in the booms. I covered the model with aluminum MonoKote and painted the canopy frame and radiator housings with matching LustreKote. I used a self-adhesive covering for the invasion stripes on the wing and then applied the decals.

When the model is complete, it's very important to synchronize the engines. According to the instructions, for the Profile 38 to fly straight at all throttle settings, the engines should run at nearly the same rpm from idle through full throttle; a 200rpm

difference is close enough. I found it fairly easy to achieve this by fine-tuning the throttle linkages and adjusting the low- and high-speed needle valves on the carburetors.

CONCLUSION

The Profile 38 is another high-quality Great Planes kit that's easy to build and fun to fly. The plane's unique profile design reduces building time considerably, yet it still has a good scale appearance. It's easy to fly and quite aerobatic, and I love the sound of its twin engines as it flies graceful maneuvers and low flybys. If you are proficient at flying low-wing sport planes, the Profile 38 makes an excellent first twin-engine airplane. ✈

Addresses are listed alphabetically in the Source Guide on page 174.

TEST GEAR

RADIO EQUIPMENT USED:

Futaba 9CAP transmitter,
Hitec 555 receiver, Hobbico
CS-67 standard servos (6)

ENGINES USED: O.S.

.25 LA 2-strokes (2)

FUEL USED:

Powermaster
15% nitro

PROPS USED: 9x4

Master Airscrew



FLIGHT **TEST**

BY LARRY COOPER

“LANDING THE
C-47 IS A JOY!”



GWS

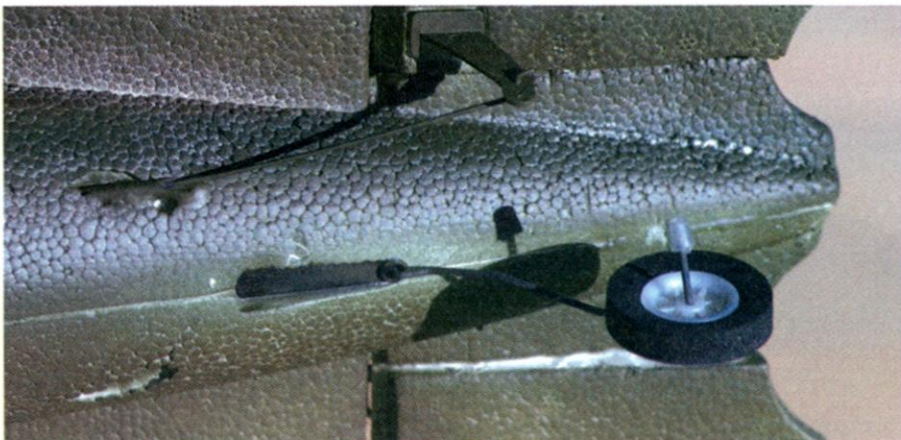
C-47 Skytrain

PHOTOS BY JOHN REID > LARRY COOPER



A vintage workhorse

I love building and flying planes that are patterned after vintage aircraft, and the new GWS C-47 Skytrain has a winning combination of vintage looks and stable flight. The plane I received was the unpainted version; it is also available in green and silver. I had a choice to make: did I want to paint the C-47 in a military or civilian color scheme? For me, the military scheme was by far the coolest choice.



A simple Z-bend connects the elevator pushrod wire to the control horn. To make installation easier, insert the Z-bend before you attach the control horn to the elevator.

THE KIT

The C-47 is made entirely of foam—three pieces for the wing, two for the fuselage and a horizontal stabilizer. Five bags hold all the extra parts needed, including two motors and mounts, pushrod wires, wheels, glue and a small piece of clay that's used to balance the model. Five sheets of decals have the various symbols for different versions of the C-47. A 22-page, full-color manual guides you through construction and even has 3-view drawings of three C-47 color schemes.

ASSEMBLY

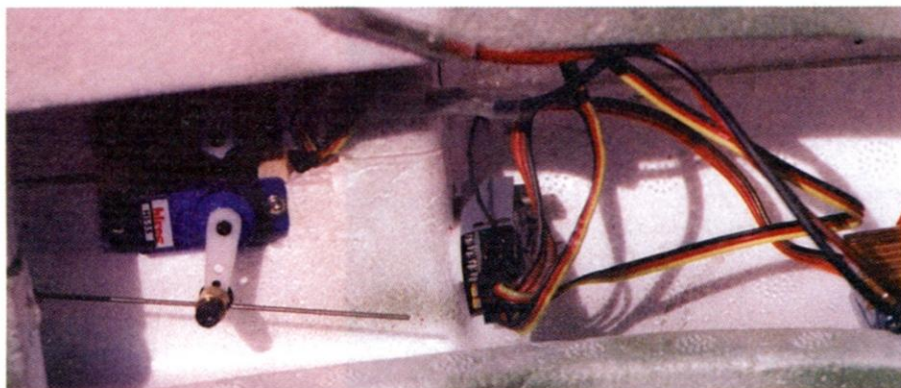
I always compare the parts inventory with the parts supplied to make certain that every little piece is there. The instructions are brief, but the pictures are excellent, and numbers in the text match the numbers in the photos to help you to understand each step.

► **Wing** The wing is the most complicated part of the building process. I used 30-minute epoxy to join the three wing pieces. After cutting the ailerons out of the wing, I hinged them back on using Du-Bro plastic hinges and epoxy. Paper hinges are supplied with the kit, but I prefer plastic. To mount the motors

on the wing, epoxy a short piece of basswood into the slot in the wing. The basswood accepts the motor-mounting bracket. The motors are secured to the bracket with a couple of screws, and the bracket is secured to the wood with one screw. Three plastic tabs are glued to the wing's motor-mounting surface; these are used to secure the motor cowls in place. I cut out and fitted the cowls over the motors and attached them to the wing by screwing them to the plastic tabs. I installed an HS-55 servo to operate the aileron linkage. I then attached the landing gear to the wing and installed the mounting dowels in the wing's leading edge.

► **Fuselage** The fuselage comes in two pieces. Before gluing them together with the provided GWS glue, I cut the rudder out of each half and installed the rudder linkage and wing-mounting nut. The sides were easy to align for gluing using the interlocking pins. Three small pieces of tape held the sides together until the glue had dried. After removing the tape, I installed the tailwheel and the servos.

► **Tail feathers** I used 30-minute epoxy to glue the two rudder halves together and then cut the appropriate hinge slots in the fin and



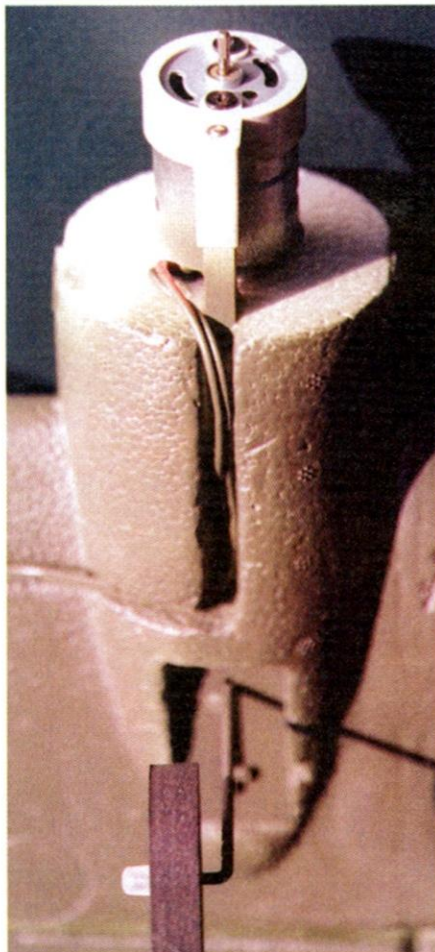
The radio compartment is spacious; installing the servos, receiver and ESC is easy.

SPECIFICATIONS

MANUFACTURER: GWS
TYPE: scale backyard flyer
LENGTH: 31.9 in.
WINGSPAN: 47 in.
WING AREA: 282.1 sq. in.
WEIGHT: 19.2 oz.
WING LOADING: 9.8 oz./sq. ft.
MOTORS INCLUDED: 2, Speed 300s
PROPS INCLUDED: 2, 5x3 plastic
RADIO REQ'D: 4-channel w/3 microservos
PRICE: \$87.50

COMMENTS

This good-looking scale plane flies great. The sound of the twin motors is way cool.



The motor installation is straightforward; simply secure the motor to the wing with epoxy.

HIGHLIGHTS

- Easy to construct
- Solid flight performance



THE LEGENDARY C-47: A GOONEY BY ANY OTHER NAME

GEN. DWIGHT EISENHOWER DIDN'T HESITATE WHEN ASKED TO NAME

the Allied weapons that helped the most to end the War. In no particular order, he listed, "The bazooka, the jeep, the atom bomb and the C-47."

The bazooka turned lowly GIs into feared tank killers. The jeep gave Eisenhower's commanders incredible flexibility when moving around the battlefield. The atom bomb saved many thousands of GI lives by ending the whole thing. The C-47, however, instantaneously gave GIs what they needed to fight, when and where they needed it. Before there were beachheads, before there were roads, before there was any other way to move men and equipment, the "Gooney Bird" was there.

When military brass ordered the first of nearly 10,000 C-47s in 1940, they envisioned it as a freighter, and large cargo doors and a beefed-up floor were added. Shortly thereafter, they realized that as many as 27 fully equipped paratroopers could be loaded into it and dropped wherever needed. These aircraft not only had smaller doors and provisions for seats along the sides, but they also had—are you ready for this?—a round hole in the middle of each passenger window so that troops could stick their gun barrels out and fire at attacking aircraft.

The feats of the C-47 during WW II are legendary: 4,800 troops dropped during the invasion of Sicily and an amazing 60,000 dropped at Normandy, in addition to towing several thousand gliders. In the Pacific, as soon as runways had been secured or hacked out of island jungles, endless streams of the old birds supplied embattled troops. The C-47 was the Huey of its day; it brought men and equipment in and left with the wounded.

Pilots had a real love/hate relationship with the old bird. On the one hand, it was a slow, plodding beast (170mph on a good day); on the other, pilots knew it would take care of them. Its long wing



and big control surfaces let it fly easily on one engine, and its crews knew it could handle whatever the weather threw at them.

In many ways, the C-47 was an aerial jeep because it was used in so many ways that it wasn't designed for. It flew on skis and floats, and during the 1947-'49 Israeli/Arab conflict, Egyptians even tried using them as bombers; they rolled bombs out through the open doors, only to find that they were dog meat for the Israeli-flown, Czech-built Messerschmitt 109s.

During the Vietnam War, Gooneys—armed with a trio of 7.62mm Gatling guns—became "Spookies" or "Puff the Magic Dragons." Troops on the ground said a Gooney's 18,000 rounds a minute hitting the jungle sounded like a gigantic bug chewing on the trees.

Of all the types of aircraft built during WW II, the C-47 more than any other is still actively working for a living in far corners of the world. The old airplane will probably outlast every single person reading this—a sobering thought. But then, that's how legends are made. — Budd Davison

Visit Budd on the Web at airbum.com



IN THE AIR

The C-47's two motors and 5x3 props give it enough power to take off smoothly and climb out at an approximately 20-degree angle. The available thrust is enough to allow a gentle turn immediately after takeoff without any risk of stalling.

CONTROL THROWS

Elevator: ± 1 in. (high); $\pm 3/4$ in. (low)
Aileron: $\pm 1/2$ in. (high); $\pm 1/2$ in. (low)
Rudder: ± 1 in. (high); $\pm 3/4$ in. (low)

GENERAL FLIGHT CHARACTERISTICS

Stability: the C-47 did not show any tendency to tip-stall or yaw.
Tracking: with every control input, the plane went precisely where I directed it to go.
Aerobatics: though the C-47 is true to scale, it can do non-scale maneuvers such as rolls.

Glide performance: with the motors off, the plane descends rapidly. It's best to land it while you still have battery power left.

Stalls: even with excess up-elevator, the C-47 is controllable. When it stalls, its nose drops and it speeds up, but I can easily regain full control.

PILOT DEBRIEFING

The C-47 flies so well that you can be confident about its performance from the very first takeoff. The C-47 is very forgiving of stick over-control, and when the control inputs are smooth, it responds appropriately. If you are a beginner with some experience, this is a good plane to make the transition to intermediate status. The ailerons allow you to bank the plane much more steeply than you can with just rudder control. The steerable rudder tailwheel will also help anyone to make the transition from novice to intermediate because you can taxi the plane around on the ground using your left control stick to steer it—something you can't do with a 3-channel aircraft.

rudder. I attached the rudder using Du-Bro hinges.

I cut away the elevators for the horizontal stabilizer and then inserted the stabilizer and the elevator joining wire through the slot provided at the rear of the fuselage. I aligned the stabilizer, making sure that the stabilizer tips were the same distance from the wingtips, and then epoxied it into place. Now hinge the elevator halves and secure the elevator to its joining wire. Use epoxy to attach the control horns to each control surface.

► **Power system** The plane is powered by two Speed 300 motors wired in parallel. I used a GWS ICS480 speed control to control them. I used the supplied wire Y-harness because it matched the controller perfectly.

► **Radio gear** The instructions tell you to mount the servos with double-stick tape, but I also epoxied two small strips of wood to the

fuselage. I used screws to secure the servos to the wood. The linkage between the servos and control horns is straightforward; Z-bends are used to attach all the linkage. I mounted the receiver in front of the servos in the same compartment as the speed control.

► **Final assembly** The wing is joined to the fuselage with two plastic dowels on a leading-edge plate that matches a plate with two receiving holes in the fuselage. The rear of the wing is secured with a long screw that mates with a nut in the fuselage.

I painted my C-47 Olive Drab to re-create the military color scheme. To do this, I used a technique described in the May 2004 issue of *Backyard Flyer* magazine. When the paint had dried, I applied the appropriate decals.

FINAL THOUGHTS

The new GWS C-47 is an easy-to-build scale foam plane with lots of molded-in intricate

details. It's extremely resilient, and that means more stick time. The C-47 is reasonably priced and offers a terrific value for anyone who wants a scale backyard aircraft. ✈

Addresses are listed alphabetically in the Source Guide on page 174.

TEST GEAR

RADIO USED: Hitec Laser 4, GWS R4P receiver, 3 Hitec HS-55 servos

BATTERY USED: Thunder Power 1900mAh 7.4V Li-poly



FLIGHT **TEST**

BY PETER ABBE



AEROWORKS

Edge 540T ARF

PHOTOS BY PETER ABBE > CHERI SASSMAN

Tear up the sky with this scale aerobat!

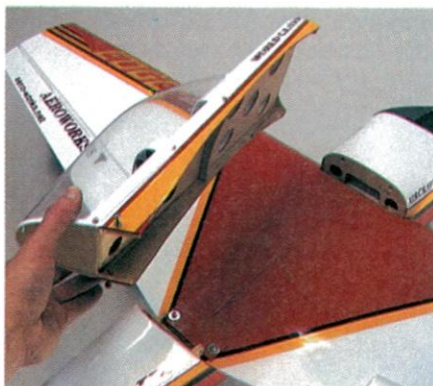
THE TWO-PLACE ZIVKO EDGE 540T IS POSSIBLY the hottest aerobatic machine in its class. Designed by Bill Zivko, former shop manager at Burt Rutan's Scaled Composites, it is a high-tech work of art that's crafted using the most modern methods and materials. With its modified 340hp Lycoming IO-540 engine, carbon-fiber spars and all-composite wing and empennage, it is a cutting-edge aircraft with precision agility. The Aeroworks .40 Edge re-creates this world-class performance in a compact, economical ARF that can quickly be assembled into a model that's guaranteed to appeal to any hot-thumb pilot who aims to tear up the sky!





KIT CONTENTS

I didn't find any loose parts, and the model's structure wasn't damaged at all. Most of the components are made of built-up balsa and plywood; the turtle deck and hatch are balsa-sheeted foam. The high-quality fiberglass cowl and wheel pants are painted at the factory to match the UltraCote-covered airframe. I spent some



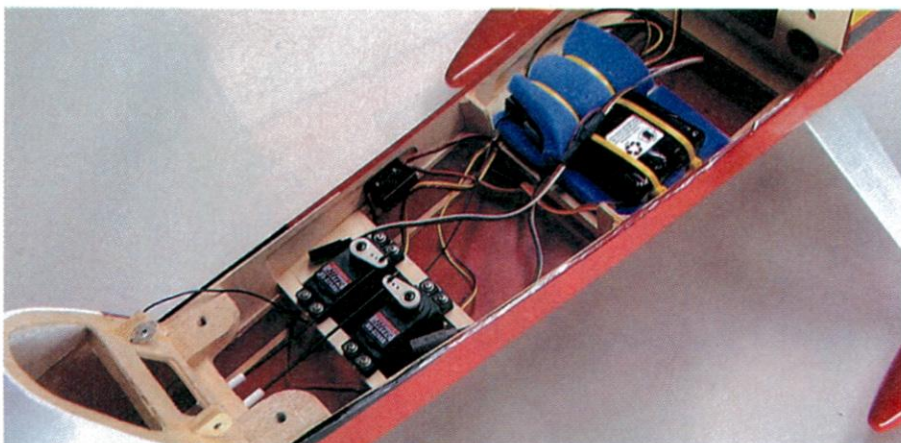
The canopy hatch is easy to remove when you want access to the wing and fuselage.

time with a heat gun and an iron smoothing down the covering.

The hardware package is complete and contains pushrods, clevises, control horns, fuel tank, engine mount, spinner, aluminum landing gear, tailwheel unit, wheels, wheel collars and all the necessary nuts, bolts and screws. A 12-page, photo-illustrated instruction manual and full-color photo sheet detail the model's assembly. A pilot bust and a sheet of adhesive colored decals help you to give the model a finished appearance.

➤ **Wing** Assembling the wing is a quick and easy task. Hinge slots are already cut, and CA hinges are provided for quick aileron installation. Removing the covering from the servo-mount areas reveals threaded holes that are used to route the servo leads through the ribs to the center of the wing. After setting up the pushrods and control horns, join the wing halves with epoxy and a hardwood brace.

➤ **Fuselage and tail feathers** The fuselage is not difficult to assemble, but it takes time



There's ample space for all the radio gear. Zip-ties hold the battery and receiver in the installed plywood tray. I installed the battery behind the servos to move the model's center of gravity farther back.

SPECIFICATIONS

EDGE 540T ARF
MANUFACTURER: Aeroworks
TYPE: scale aerobatic
LENGTH: 50.5 in.
WINGSPAN: 56 in.
WING AREA: 609 sq. in.
WEIGHT: 6 lb. 4 oz.
WING LOADING: 23.6 oz./sq. ft.
ENGINE REQ'D: .40 to .46 2-stroke
RADIO REQ'D: 4-channel w/5 servos
PRICE: \$179.95

COMMENTS

This scale aerobatic model is easy to assemble and it flies well, so it's an excellent choice for anyone who's in the market for a great-looking, compact, precision model.

to set it up properly. The main landing gear is attached to a plywood plate in the fuselage with three steel bolts. Each wheel pant is held by a small setscrew and a large bolt that doubles as an axle. I had to enlarge the wheel pants' openings to provide enough clearance for the foam wheels and wheel collars.

The engine is mounted horizontally on an adjustable composite mount; a fiberglass exhaust deflector is already installed in the fuselage nose, and it will fit most stock 2- and 4-stroke mufflers. Although the throttle-servo tray is in the fuselage, I chose to build a plywood servo box and mount it on the firewall. This allowed me to set up the throttle linkage more easily and to balance the model without adding any additional weight.

After mounting the engine, I used the two-piece, transparent-plastic cowl to mark the positions of the required cowl cutouts. This was a quick and easy way to accurately modify the cowl to accommodate my engine. I mounted a Slimline Excel fueler on the side of the cowl and installed a Model Products Head Lock remote glow igniter. These will allow easy fueling and starting at the field.

There are plywood trays in the fuselage for the battery and receiver; glue the servo tray into place. Steel pushrods in installed nylon tubes actuate the elevator and rudder. These linkages were very tight, and they also

HIGHLIGHTS

- Finished appearance
- Complete hardware package
- High-quality fiberglass and built-up structures



tended to bind when at maximum control deflections.

Epoxy the fin and stabilizer into position, and hinge the control surfaces with CA hinges. It is important to refer to the colored instruction sheet to see the correct elevator-assembly sequence; if you don't, you might later have to perform minor surgery on the tail. Mounted

canopy to the hatch, apply the decals and balance the model. My Edge 540 required about 1 ounce of extra weight in the left wingtip to balance out laterally.

The recommended CG is 2.75 inches behind the wing's leading edge at approximately 25 percent of the mean aerodynamic chord (MAC); this proved to be a

“This model is guaranteed to appeal to ANY HOT-THUMB PILOT who aims to TEAR UP THE SKY!”

on a plywood plate in the base of the fuselage, the tailwheel bracket is driven by the rudder.

➤ **Finishing up** To finish, check the fit of the wing and the hatch, screw the plastic

conservative starting point. I slowly moved the CG backwards $\frac{1}{8}$ inch at a time to 3.25 inches behind the leading edge (approximately 29 percent of MAC), and flight performance improved significantly. If you do this, be very careful. The model has a fairly small horizontal stabilizer and a moderate wing loading. Moving the CG backwards too far could quickly yield an unfriendly model!

FINAL THOUGHTS

The Aeroworks .40 Edge 540T is a compact, economical ARF that's well suited to intermediate and advanced pilots. Its completeness and high-quality components make it a good value for anyone who wants to enter the world of scale aerobatics. Be sure to select a strong enough engine to bring out its maximum performance! ✦

Addresses are listed alphabetically in the Source Guide on page 174.

With the Saito .72 swinging a wide, 14x4 APC prop, takeoff runs are short, to say the least. Holding a little up-elevator (to prevent the prop from striking the ground) and going to full power gets the model airborne in about 20 feet.

CONTROL THROWS:

Elevator: $\pm \frac{3}{4}$ in. (high); $\pm \frac{1}{2}$ in. (low)

Aileron: $\pm \frac{3}{4}$ in. (high); $\pm \frac{1}{2}$ in. (low)

Rudder: ± 2 in. (high); $\pm 1\frac{1}{2}$ in. (low)

GENERAL FLIGHT CHARACTERISTICS

Stability: the model feels very stable and can be slowed down to a crawl before it drops a wingtip, as long as the wings are kept level.

Control response: the Edge tracks smoothly and has a very precise feel; tight control-surface setup eliminates any sign of flutter.

Aerobatics: this is what the Edge is all about! This thoroughbred design performs graceful aerobatics with authority and precision.

Glide performance: the Edge glides reasonably well, but it's no floater. Keep its nose down and take care not to over-control it; too much up-elevator can induce tip-stalling.

Stalls: all control surfaces remain effective, right up to stall speed. Release elevator backpressure and add throttle for a quick recovery. Pulling back hard on the elevator will result in tip-stalling and a considerable loss of altitude. Be sure to feel this model out at altitude to gain an understanding of its stall characteristics.

PILOT DEBRIEFING

With unlimited vertical performance, looping maneuvers are as large and as round as you like; pulling the power back to idle on vertical downlines turns the prop into an air-brake. Rolls range from precise point rolls to slow rolls that can be stretched the entire length of the field to fast, high-rate axial rolls. Knife-edge flight is effortless, with hardly any pitch-and-roll coupling. Snap rolls are violent at full deflection and require about $\frac{1}{2}$ rotation for recovery. Spins, flat spins and tumbling maneuvers are excellent; again recovery takes about $\frac{1}{2}$ rotation.

Landing the Edge 540 is somewhat different from landing an average sport model. It has a very neutral feel, so you don't need to hold up-elevator on final approach. Once the model is lined up, use throttle to control the descent rate and elevator to control attitude. If the nose is too high, the model may tip-stall; if it's too low, it will descend too rapidly. With a little practice, I soon had it doing spot landings right in front of me.

TEST GEAR

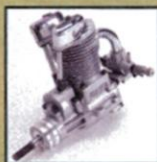
RADIO USED:
JR 662

ENGINE USED:
Saito .72

FUEL: Wildcat 2&4
Cycle 15% nitro

SERVOs: Hitec
HS-322 HB
(throttle);
HS-325HB (all
control surfaces)

PROP USED:
APC 14x4W



FLIGHT TEST

BY ERIC BEAN



CERMARK **G-3D**

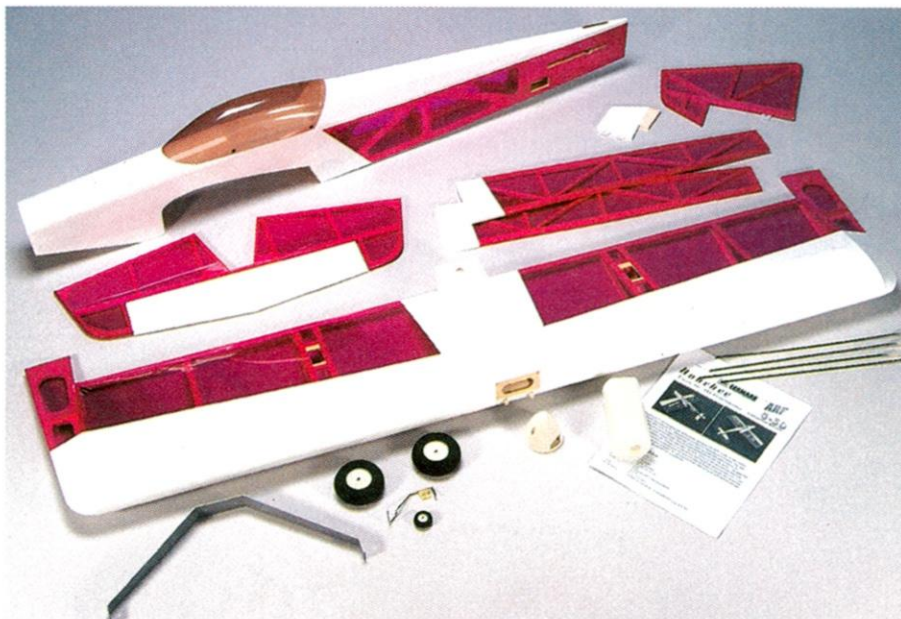
BANCHER



40

All-out 3D performer

THE 3D CRAZE HAS REALLY TAKEN HOLD AT MY CLUB, so I was excited to assemble and fly the new Cermark G-3D Banchee 40. The minute I opened the box, I knew that the manufacturer had already done all the hard work for me. This professionally covered model looked as if it was going to be just as much fun to assemble as it would be to fly. I couldn't wait to get started.



SPECIFICATIONS

G-3D BANCHEE 40
 MANUFACTURER: Cermark
 TYPE: 3D aerobatic ARF
 LENGTH: 53 in.
 WINGSPAN: 54 in.
 WING AREA: 710 sq. in.
 WEIGHT: 4.8 lb.
 WING LOADING: 15.6 oz./sq. ft.
 ENGINE REQ'D: .46 to .52 2-stroke,
 .52 to .72 4-stroke
 RADIO REQ'D: 4-channel w/5 servos
 PRICE: \$159.95

COMMENTS

The G-3D is an excellent 3D airplane that goes together fast and flies great. The Saito FA-72 gives the Banchee unlimited vertical performance and the ability to do any maneuver you can think of.

THE KIT

The Banchee features all-wood construction and is covered in UltraCote. It has a one-piece wing, assembled elevator, horizontal and vertical stabilizers and cutout servo bays. The hardware package includes CA hinges, landing gear, wheels, fuel tank, pushrods, control horns, clevises and a completed tailwheel assembly.

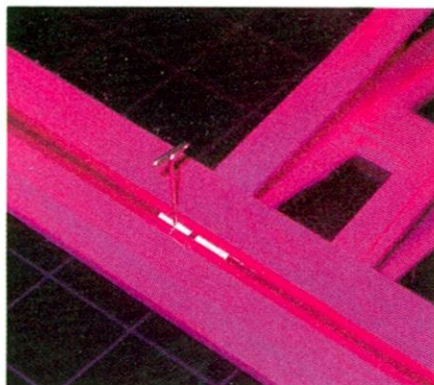
ASSEMBLY

This airplane almost assembled itself! The wing and ailerons are slotted to accept the CA hinges provided, so I centered the hinges with a T-pin and checked to make sure that I had at least 45 degrees of throw before I added a few drops of thin CA to each hinge. The elevator was a little too large to fit through the cutout in the fuselage, so I extended the slot $\frac{1}{8}$ inch to the rear. This allowed me to slide the elevator through first,

followed by the horizontal stabilizer. I noticed that there was a slight warp in the elevator, so I twisted the warp out and used my heat gun to re-shrink the UltraCote. I bolted the wing on so that I could check the alignment of the horizontal stab and then marked the top and bottom where it met the fuselage. After carefully cutting away the covering about $\frac{1}{16}$ inch inside the lines, I slid the stabilizer back into place, rechecked the alignment and then glued it to the fuselage with 5-minute epoxy. The elevator and horizontal stab came slotted for CA hinges that I glued

into place with thin CA. The slot for the vertical stabilizer was pre-cut, and the covering was already removed, so I checked the fit and glued it into place with 5-minute epoxy. Once again, the rudder and vertical stab came slotted for CA hinges that I centered with T-pins and then glued with thin CA.

I used a soldering iron to expose the landing gear's factory-installed blind nuts. This gave a clean hole and sealed the covering to the fuselage. After bolting on the gear, I attached the light wheels with the provided hardware. The 9-ounce fuel tank provided



After centering the CA hinges, I pushed a T-pin through to hold them in place while I joined the control surfaces. When I was satisfied with the fit, I pulled the pin and added a few drops of thin CA.



The fuel line is separated at the forward end when filling the fuel tank and then reconnected for flight. A small hole was drilled in the cowl to allow the fitting of a mixture screw extension.

E-3D BANCHEE

IN THE ARF WORLD, ASSEMBLY does not get much simpler than it is with the E-3D Banchee. Its construction is very similar to the G-3D Banchee's; the main difference is in the fuselage. The E-3D Banchee has a different firewall and a motor-mount setup with a bottom section of the fuselage open to allow easy access to the batteries.

There is a variety of power options for the Banchee E-3D and quite a bit of published data to consider. I used a Hacker B50 13S with a 6.7:1 planetary gearbox. I matched the Hacker B50 to a Hacker 77A Opto controller; this allows plenty of room to grow just in case I want a larger motor/prop combination in the future. I decided on an 18x8 APC prop for my initial flights; this should

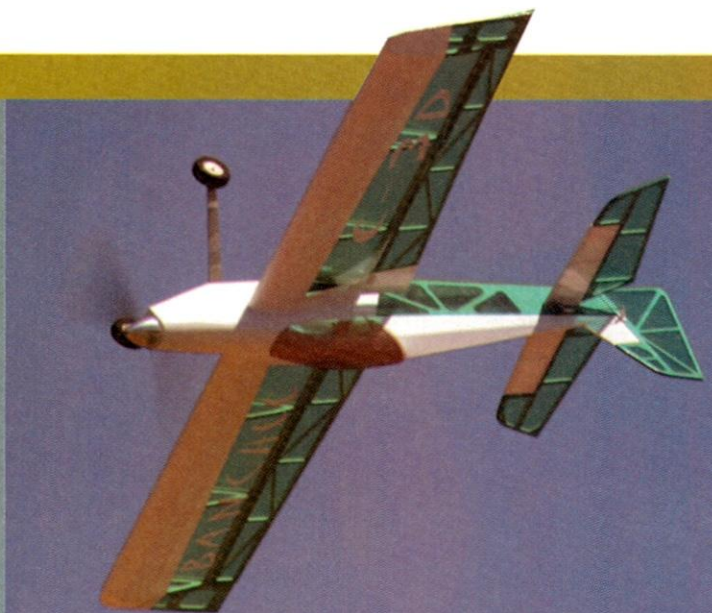
provide huge amounts of thrust while limiting the speed.

Last, I needed a power supply, and this was supplied by a 4S4P 8000mAh Thunder Power Li-poly pack. My bench tests with the 18x8 APC yielded 49 amps and 675 watts at full throttle.

At the field, I noticed that the two Velcro® hold-down straps used to secure the pack allowed some battery movement. Operating on the cautious side, I added a few more Velcro® squares to the battery pack; this provided a very firm attachment.

This is an outstanding plane to fly and one that I will continue to fly week after week. The lightweight construction and abundance of power give this plane an outstanding performance combination.

—Dave Kemper



TEST GEAR

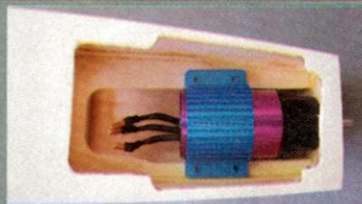
MOTOR: Hacker B50 13S w/6.7:1 planetary gearbox and 77A Opto ESC

PROP: 18x8 APC

BATTERY: 4S4P 8000mAh Thunder Power Li-poly

POWER: 49 amps and 675 watts at full throttle

FLIGHT DURATION: 30 min.



The design of the motor compartment allows safe and secure installation of the Hacker B50 13S brushless motor. The open bottom allows easy access for maintenance.

in the kit fit snugly in the forward bulkhead and was secured with Zap-A-Dap-A-Goo.

ENGINE

I powered the Banchee with a Saito FA-72, which was slightly wider than the spacing provided by the pre-installed mounting rails. I used my Dremel tool fitted with a rotary sanding drum to remove about 1/16 inch of the hardwood rail material. After marking

and drilling the engine boltholes, I attached the provided blind nuts and secured them with a dab of 5-minute epoxy. The carburetor on the Saito is at the rear of the engine; this makes it tricky to set up the throttle linkage without binding because there isn't much room between the firewall and the back of the engine. A little Dremel work and a simple 90-degree bend in the pushrod solved the problem. I attached the pushrod to the throt-

tle arm before I bolted on the engine.

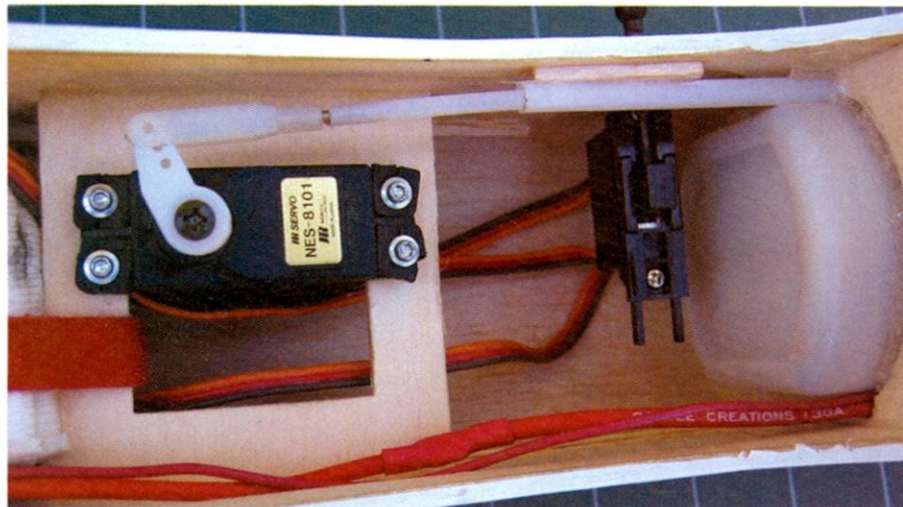
There wasn't any need to drill a hole for the exhaust because the muffler hangs completely outside the cowl. I liked the idea outlined in the manual of using the filling system that looped the fuel line outside the cowl. I drilled a couple of holes and ran the fuel tubing out through the cowl in one hole and back into the cowl through the other. After I had cut the fuel tubing, I used a short piece of brass tube to connect the ends. I removed some material from the supplied spinner to accommodate the 14x6 APC propeller. Low-idle reliability (particularly for inverted engines) and easy starting are facilitated with an onboard glow driver, so I installed one from C-Tronics. The unit is compact and very easy to use. Just turn the radio on at idle throttle setting, cycle the throttle up and then back to idle again, and the system is armed.

RADIO INSTALLATION

The radio installation is very straightforward.

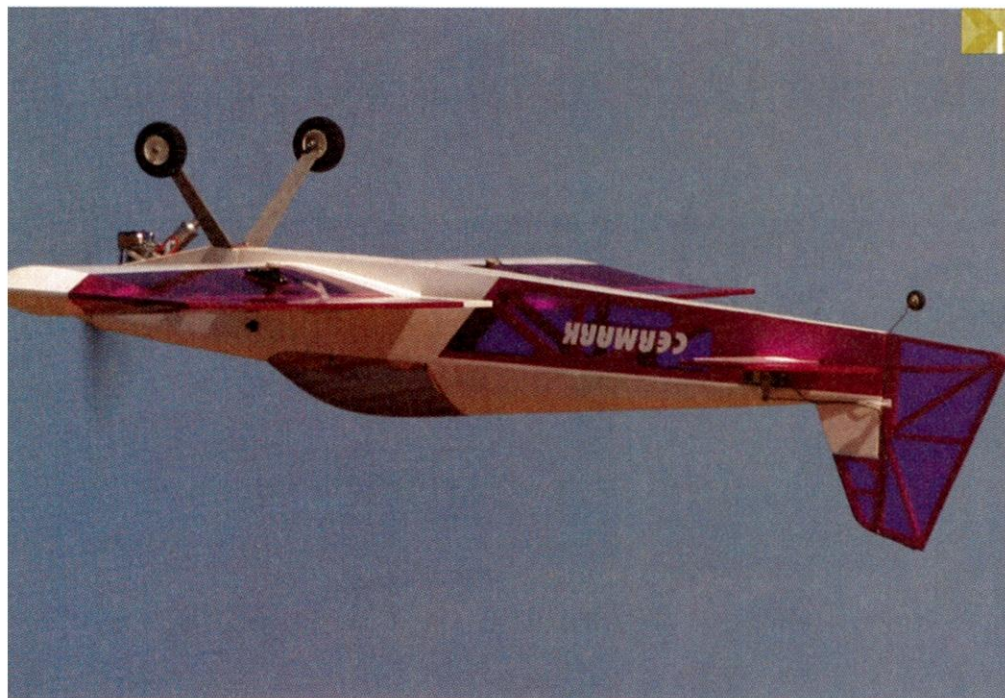
HIGHLIGHTS

- Easy to build
- Complete hardware package
- Great-looking



There's lots of room for the radio gear. Here you can see the throttle servo, receiver switch, fuel tank and the wiring for the onboard glow.

IN THE AIR



I mounted the throttle servo in the precut servo bay and trimmed the supplied pushrod to fit. I fitted the rudder and elevator servos with Du-Bro heavy-duty, 1-inch control arms and mounted them in the precut servo bays. I

that there was no interference between the elevator and rudder pushrod before I connected the rudder control horn. The aileron servos went right into the precut servo bays and also installed the control horns with the

“If you can think of it, THE BANCHEE CAN DO IT!”

mounted the control horns so that the holes were over the control-surface hinge line, the supplied pushrods and clevises were attached at the control horn, and a Z-bend was attached at the servo arm. Because of the large control throws used in 3D flying, I made sure

holes over the hinge line. I again used the Du-Bro heavy-duty, 1-inch control arms here.

TEST GEAR

RADIO: JR 8301 transmitter, Hitec Electron 6 receiver and 5 JR 8101 servos

ENGINE: Saito FA-72 with C-Tronics onboard glow driver

FUEL USED: Performance Plus 15%

PROP: APC 14x6



FINAL ASSEMBLY

I assembled the airplane and checked the center of gravity (CG); it came out right at 4 inches from the leading edge. This fell within the recommended guidelines for sport flying. The manual suggests moving it back to 4.5 to 4.8 inches for 3D flying, and that is what I wanted to do. So, I mounted the receiver battery back as far as I could in the main radio compartment. I mounted the receiver with Velcro® and moved it between the throttle servo and the receiver battery.

FINAL THOUGHTS

The Cermark G-3D Banchee 40 is an attractive, easy-to-build and fun-to-fly airplane. You'll be pleased with its high-quality craftsmanship and great flight characteristics. If you've wanted to get into 3D aerobatics or want to extend your 3D portfolio, you can't go wrong with the Cermark G-3D Banchee 40. ✈

Addresses are listed alphabetically in the Source Guide on page 174.

The G-3D Banchee 40 was equipped with a Saito FA-72 and an APC 14x6 prop running on Performance Plus 15-percent fuel. I also installed a C-Tronics onboard glow system for easy starts and a very stable low idle.

CONTROL THROWS

Elevator: 1 1/4 in. (high); + 1/2 in./- 1/2 in. (low); expo: 55% (high); 25% (low)

Aileron: 2 1/4 in. (high); +1 in./-1 in. (low); expo: 65% (high); 25% (low)

Rudder: 2 in. (high); +1 in./-1 in. (low); expo: 65% (high); 25% (low)

GENERAL FLIGHT CHARACTERISTICS

Stability: the G-3D is exceptionally stable even at very slow speeds, right-side-up or upside-down.

Tracking: the Banchee goes where you point it. With the exception of a little pitch coupling with rudder on knife-edge, it tracks beautifully.

Aerobatics: if you can think of it, the G-3D can do it.

Glide performance: the light wing loading and thick airfoil provide a high glide ratio in the event of a deadstick landing.

Stalls: low-speed stalls are straight ahead if entered with wings level.

PILOT DEBRIEFING

I've flown the G-3D on calm and windy days. This beauty is extremely stable and tracks well, but the real story is its aerobatic performance. If you can think of it, the Banchee can do it! Traditional aerobatic maneuvers are easy to perform: rolls, loops, Cuban-8s, spins, rolling circles and stall turns are a piece of cake. There is some roll and pitch coupling in knife-edge flight, but it requires very little correction to fly the entire field length on edge. Harriers, elevators and waterfalls are good with the CG at the starting position, but it needs to go back to the rear-most recommended position to get really flat spins and make high-alpha flight and torque rolls easier. With the Saito FA-72 up front, you can hover at less than 1/2 throttle, and if you get a little out of position, a blip of power gets you righted immediately. The Banchee slows quickly when you chop the throttle, so keep a little power on final. When over the threshold, reduce the throttle to idle and slowly add up-elevator until it settles onto the runway.

EXCLUSIVE FIRST LOOK!

JR

XP9303

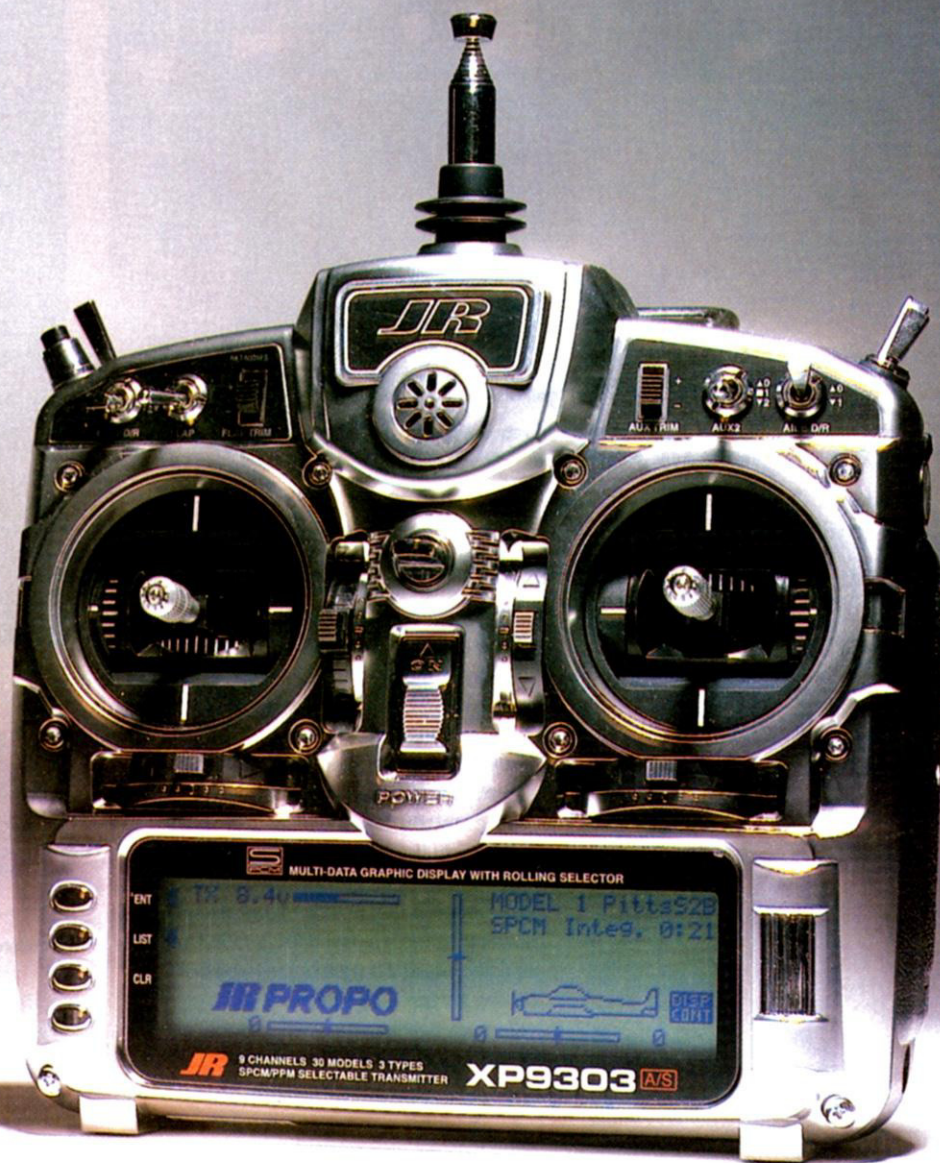
9 channels
30-model memory
3 model types

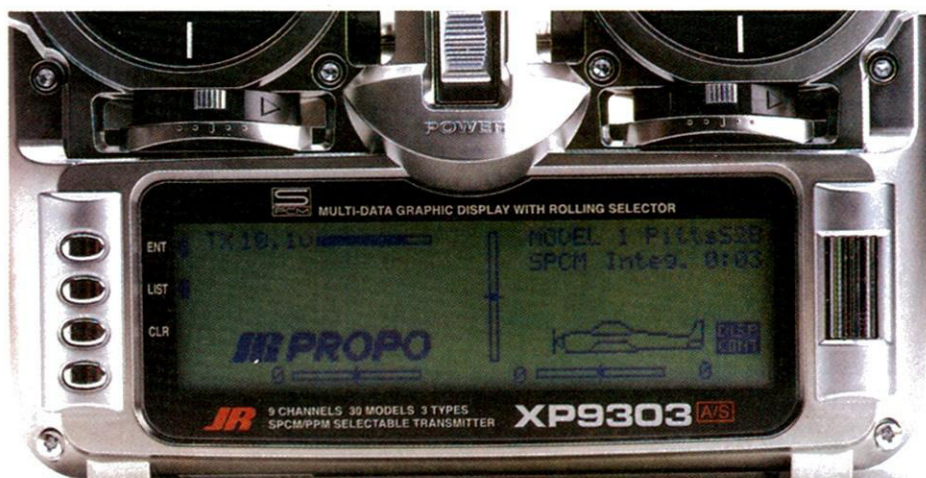
THE LONG WAIT IS OVER: JR'S NEW XP9303

radio system is here! I've been a JR user since the early '80s, and I still have my first basic Max 4 and 6 radios. They served me well, and even as I've progressed to more sophisticated radios, I just haven't had the heart to get rid of them. Every new radio in the long and successful JR line has brought with it new features to help modelers gain a competitive edge. JR's latest offering is a 9-channel computer radio with some pretty interesting features of its own. Let's see what's new.

FEATURES

The XP9303 radio system comes with three basic software menu choices for powered aircraft (Acro), sailplanes (Glid) and helicopters (Heli). My review radio came with four DS811 digital servos, a PCM NER-649S receiver, an 1100mAh Ni-Cd pack, a standard switch harness, an overnight wall charger, a 12-inch aileron servo-lead extension and basic servo hardware. The instruction manual is well written and includes several illustrations to help you understand the radio's various functions.





The main screen is easy to see, and thanks to the innovative rolling selector (to the right of the screen), navigating and making adjustments to the radio's menus is quick and easy.

SPECIFICATIONS

Manufacturer: JR

Distributor: Horizon Hobby Distributors

Transmitter

Model: XP9303

Type: aircraft

Encoder: 9-channel computer system

RF Module: plug-in

Modulation: PPM/PCM

Output power: approx. 750mW

Power source: 600mAh 9.6V Ni-Cd

Output pulse: 1,000 to 2,000 (1,500 neutral)

Receiver

Model: R649

Type: 9-channel/SPCM-ABC&W

Frequency: 72/75/50MHz

Weight: 1.5 oz.

Servo

Type: digital

Model: DS811

Torque: 54 oz.-in.

Speed: 0.18 sec./60 deg.

Size (LxWxH): 1.49x0.75x1.52 in.

Motor type: cored

Prices: Airplane R649 4-DS811

\$599.99; Heli R649 4-DS811

\$799.99; Sailplane R770 3-DS368

\$599.99

Working clockwise from the transmitter's upper left corner are the following switches and buttons: gear, trainer, elevator dual rate, flap, flap trim, auxiliary channel trim, auxiliary 2, aileron dual rate, mix, auxiliary 4/rudder dual rate, right lever, rolling selector, enter, list and clear and left lever. Each switch/button is easy to find and comfortable to use.

Digital trims are used with the rudder, elevator and aileron, while the throttle trim remains the friendly and easy-to-manage mechanical type. The transmitter has a nice ergonomic feel, and at first glance, it looks very similar to the JR 10X. Closer examination, however, reveals a new twist: a handy rolling selector just to the right of the large LCD display screen. This selector is the biggest difference between the 9303 and the 10X with its touch-screen data management. The

“The choices offered by the 9303 are limited only by your imagination.”

navigation and adjustment of these menus are quick and intuitive using the Enter button or the rolling selector. Very cool!

MAIN DISPLAY

The 9303's graphics shown on the main screen are very well thought out and easy to read. There's little to confuse you. Trim positions are clearly shown, as are all the names for the various menus and functions. Displays for dual rates, expo, throttle curves and programmable mixes are large and displayed to the right of the screen when needed.

AVAILABLE SYSTEMS

The 9303 is available in four system configurations:

Transmitter and receiver only:

includes your choice of transmitter with one R770S receiver.

► **Airplane:** one XP9303A/S transmitter, one R649 receiver, four DS811 servos and one 1100mAh battery pack.

► **Sailplane:** one XP9303A/S transmitter, one R770 receiver, three DS368 servos and one 700mAh battery pack.

► **Helicopter:** one XP9303H transmitter, one R649 receiver, four DS811 servos and one 1100mAh battery pack.

(See sidebars on pages 94 and 96 for helicopter and sailplane system use.)



Standard Acro PCM System components.

The first step for setting up the radio for a new model is the System Menu. Press down and hold the enter button (or the rolling selector)

SYSTEM HIGHLIGHTS

30-model memory
Rolling selector switch
Big, easy-to-read display
Switch assignability
Adjustable servo speed



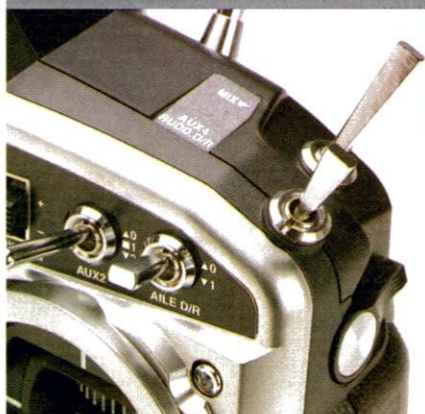
The top left corner of the radio has the trainer button, gear switch, elevator dual rate, flap switch and flap trim adjustment.

SOFTWARE FEATURES

The 9303 has three menus for powered aircraft, sailplanes and helis that contain these basic features:

- Switch assignment
- Flight modes: 3 (air); 5 (sailplane/heli)
- Dual rate/exponential (2 or 3 sets for aileron, elevator and rudder)
- Normal/flaperon/delta-wing types
- Aileron differential
- V-tail mixing
- Dual channels for all primary flight controls and flaps
- Dual throttles (with independent curve and trim curves)
- Adjustable trim rates
- Elevator-to-flap mixing
- Aileron-to-rudder mixing
- 2 throttle curves
- Flap system (3-position with elevator compensation and delay adjustment)
- Snap-roll system (4 directions and rates assigned to flight modes)
- Gyro system (3 gains for up to 2 gyros)
- Servo-speed adjustment (in both directions)
- 6 programmable mixers (2 with multipoint adjustment)
- Fail-safe (with hold and predetermined servo positioning)
- Trainer system
- Timers (stopwatch, countdown and integrated)
- Servo monitor (automatically renames channels according to assignments)

PERSONAL FAVORITES



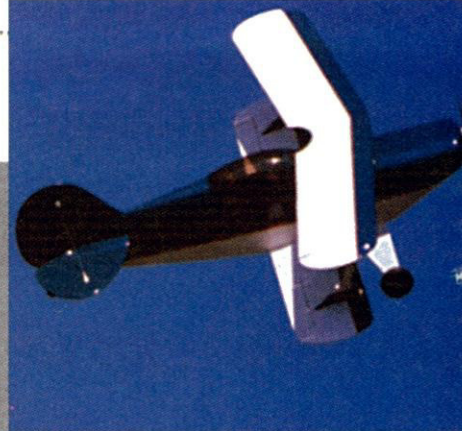
The radio's upper right corner has the switches for auxiliary trim, aux. 2 activation, aileron dual rate, mix and aux. 4/rudder dual rate.

and turn on the radio. This brings up the menu choices for Model Select, Model Name, Type Select (Glid, Acro, Heli), Model Reset, Data Transfer, Trim Step, Device Select and Wing Type. After you've made your selections and/or adjustments, press the List button (or select LST with the rolling selector) to return to the main System Menu.

To adjust the usual model function values, enter the Function Menu by turning on the radio and then pressing "Enter." Here you can use servo-reversing, dual rates/expo, subtrim, servo-travel functions as well as the advanced features, including flap system, servo speed, snap-roll, programmable mixers 1 through 6, throttle curves, aileron-to-rudder and elevator-to-flap mixing.

MODELS AND MEMORIES

I doubt whether anyone will complain about having 30 model memories at their disposal; for me, that's several years of model building! Gone are the days of four-letter names. To assign names to your various model setups, you have a generous eight-character display to play with (PittsS2B, for example) and an



AFTER I INSTALLED THE XP9303 RADIO IN MY Cermark Pitts Special, several of its features really began to shine.

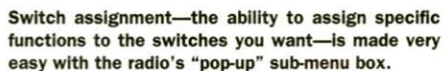
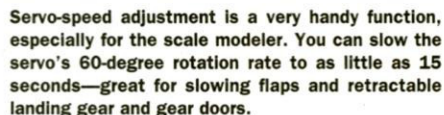
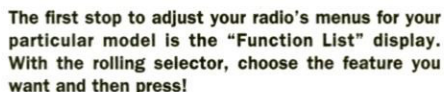
Rolling selector. My favorite! It greatly speeds menu navigation, function selection and adjustment. Even at the flying field with the model's engine running, adjustments are a piece of cake!

3+1 trim system. The three main flight-control trims (rudder, elevator, aileron) are digital and offer precise trim input with an audible indicator that tells you where you are for center, positive and negative travel. The throttle trim is mechanical—nice for setting up and dialing in throttle start, idle and kill positions.

Dual rates. The adjustment layout is especially nice. You select the specific flight control, scroll to the dual rate or exponential adjustment, and then use the rolling selector to increase or decrease the values for each function. With the control stick at neutral, you can adjust both control directions at the same time. If you move the stick one way or the other, you can adjust each side independently—pretty cool!

Device select. This feature is sweet! It allows you to easily activate/inhibit certain functions and then assign them to the switch, button, or lever you want. Since I don't use the trainer switch, I instead activated the snap-roll function and assigned it to the trainer switch. For a scale application, you can just as easily assign the retractable gear and then activate it with the trainer pushbutton. Press the button once, and the gear goes up; press it again, and the gear comes down. The choices offered by the 9303 are limited only by your imagination.

The Wing Type menu offers three control choices for normal, flaperon and delta-wing configurations and also includes programming for V-tail control. Wing Type also provides dual-channel functionality so that a second channel can be slaved to any and all of the primary aileron, elevator, rudder and flap controls. The new Twin Engine (Twin E) is also found under Wing Type, and it allows you to set up a second throttle channel complete with its own trim and throttle-trim curve adjustments. The dual-channel-selection feature is very useful because so many models today require two aileron, flap, or elevator servos for proper control. Note that to activate the Dual Channel function, you must first inhibit the various "Mate" channels that you couple to the primary channel.



THE NEW JR XP9303 TRANSMITTER is a great leap forward in capability and flexibility when compared with radios from the last decade. I've flown full-house sailplanes with five computer transmitters over the last 12 years, and the 9303 provides all I could ever ask for and much more.

The transmitter balances well and fits comfortably in my hands. The sticks, switches and sliders have that excellent "JR feel." The basic features are generally logical in their setup and use, and the advanced capabilities are positively mind-blowing.

The radio makes good use of its audio capability by emitting tones rather than just beeping to help the pilot determine the value of a digital trim without looking, for example. You can set up the digital trims for granularity of each trim-change rate.

The sailplane flight modes are Launch, Thermal, Landing, Speed and Cruise. Trim presets can be set in each flight mode for aileron, elevator, rudder, flaps and flaperon. The radio offers not only dual rates but also triple rates for aileron, elevator and rudder; these can be assigned individually in each flight mode.

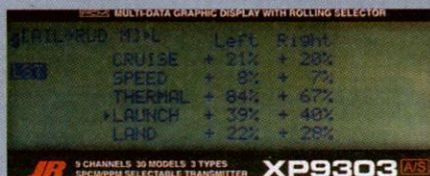
Other advanced features include: aileron and flap differential set in each flight mode; aileron-flap mix set in each flight mode; adjustable flap rate set via slide levers; and six additional user-programmable mixes.

All these advanced capabilities are in addition to the standard features we've come to expect from modern microprocessor radios, such as trainer system with selectable channels for the student; three internal timers; model data copy; V-tail mix; exponential rates and a whopping 30-model memory—now held in flash memory so that periodic memory battery replacement will not be needed.

With so many features, you may be concerned that the radio is complicated to program. Though the capabilities are extensive, my experience is that learning to use them is a manageable task. Horizon Hobby spent a year and a half developing the software to American specifications, and it provides a detailed 89-page manual full of very clear drawings, organized in a series of steps, to guide you through transmitter setup.

On my first try, I set up a 6-servo thermal-duration sailplane with the basics and was ready to fly in an hour and a half. This setup included aileron, elevator, rudder and flap functions and aileron-to rudder mix, individually set in each of the five flight modes. It did not include the control-surface presets in any of the flight modes; these and the myriad other features available will take additional hours, depending on which you choose to use.

For more information, go to horizonhobby.com and download a copy of the sailplane manual from: horizonhobby.com/Shop/ByCategory/Product/Manuals.aspx?ProdID=JRP9260. —*Dave Garwood*



This screen shows the eight-character model name "Falcon-2," the glider "drawing" and the word "Thermal," which is one of five flight modes.

Press the LST button and then select "AIL -> RUD M." This displays a screen that shows the Cruise, Speed, Thermal, Launch and Land flight modes.

A not so obvious feature is the automatic renaming that occurs in the menus when you activate the dual-channel system. In SubTrim, for instance, the normal menu shows each of the nine channels you can adjust. But when dual channel is activated, it shows subtrims for each of the two aileron, rudder, or flap servos as well. The same is true for all the menus; you can adjust all the functions for each of the Mate channels.

SERVO SPEED

This function is especially useful to the scale modeler. It allows you to adjust the speed for each channel in both directions from the servo's normal speed and slow it down to 15 seconds for 60 degrees of rotation. It cannot, however, be used to make the servo travel any faster than at its own speed rating. This function allows the flaps to move slowly to their extended positions to minimize trim adjustments. Landing-gear doors and retracts can be adjusted so the doors open quickly and close slowly so as not to interfere with the gear, as they move down slowly and retract quickly. The possibilities are endless!

THE VERDICT

The JR XP9303 is a versatile and powerful radio system that's filled to the brim with innovative features. Its rolling selector allows you to easily adjust its sophisticated menus and greatly speeds up the process. It's flexible enough to serve the demands of pro pilots yet remains user-friendly enough for sport pilots—truly a win-win for all! **A**

Addresses are listed alphabetically in the Source Guide on page 174.

COMMENTS

The XP9303 is a 9-channel, 30-model-memory, 3-model-type radio system with many high-end features. It has a large display screen and an innovative Rolling Selector to select and adjust the program menus. The 9303 comes in three configurations: powered aircraft, helicopter and sailplane, and each transmitter is arranged to best optimize model control. Each type comes with its own specialized instruction manual written by expert pilots from each model discipline.



THE HELI SIDE OF THE XP9303

IF IT WEREN'T FOR THE COMPUTER RADIO, RC helicopters wouldn't be able to do the stunning aerobatics that are so commonplace today. The new JR XP9303 heli system neatly fills the gap between JR's mid-range XP8103 and the high-end PCM10X.

The XP9303 looks very similar to the 10X with its large display screen, digital trims and switches. The main difference between the two (aside from programming functions) is that the 9303 uses a scroll wheel to input data instead of the familiar touch-screen. You access the menus via pushbuttons on the left side of the screen. Like the 8103, the 9303 has digital trims except on throttle.

As on all JR radios, there are two main menus to program. The system menu is used to set up a model's basic parameters such as model type, model name, swashplate type, modulation, etc. The function menu is the heart of the system and has no fewer than 20 functions to choose from.

The radio has all the usual JR features plus a couple of new ones. First, it provides the ability to disable a number of switches on the transmitter; Pitch Trim, Gear, Aux 2, 3 and 4 can, in essence, be turned off. This is very useful when you use auxiliary channels for special or mixing purposes.

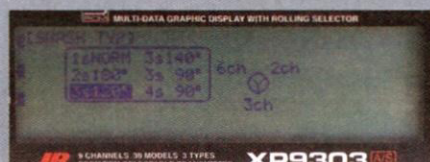
Also new is a special governor program that will work with most governor systems and allows independent rotor rpm setting of each of the active flight modes.

When I scrolled to Swash Typ and pushed the rolling selector, the screen showed six types of swashplate control: the usual one-servo mechanical mode (non-CCPM) and five CCPM modes. When you choose a CCPM mode, a small circle appears and shows the type (90, 120, 140, or 180 degrees) and channels in the receiver into which you must plug the servos—no more flipping through the manual to find this information.

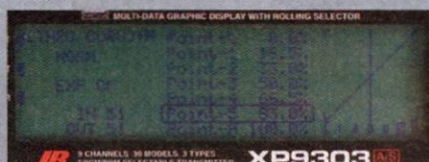
The 9303 offers up to five separate throttle and pitch curves, each with seven adjustable points and the option to smooth out the curves with the exponential function. There are three default curves and two that are activated when the Flight Mode Extra function is enabled in the Device Select menu.

The radio offers six programmable mixes. The mix can remain on all the time, or you can switch it off and on using a variety of switches. Mixes 1 and 2 have the capability for multipoint programmable mixing (much like a throttle or pitch curve), which is represented by a graph—again like the throttle- and pitch-curve functions.

The 9303 has a comprehensive list of functions, and these are straightforward to access and use with the new rolling selector. With its 30-model memory, this could possibly be the last heli system you'll ever need to buy. The transmitter feels solid and comfortable in your hands. I think the scroll wheel is an improvement on the touch screen, and it's easy to use. This system with receiver and 4 digital servos costs \$799.99. With all the features this radio offers, it's a great value. JR certainly has a winner on its hands! —Rick Bell



When you choose a CCPM mode, a small circle appears and shows the type and the channels in the receiver that you need to use.



This display shows the 7-point throttle curve and graph. You can smooth out the curve if necessary by using the expo function.

Repair sheeted foam-core wing

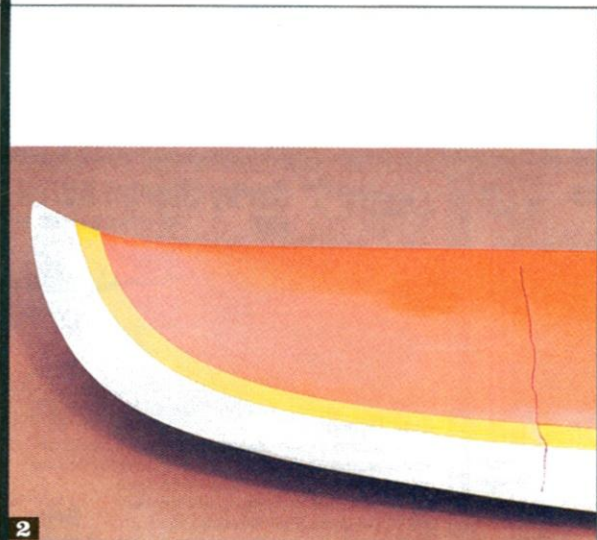
A SIMPLE REBUILD THAT IS JUST AS STRONG AS BEFORE > BY DAVE GARWOOD

OOPS! A WINGTIP STRIKE ON LANDING

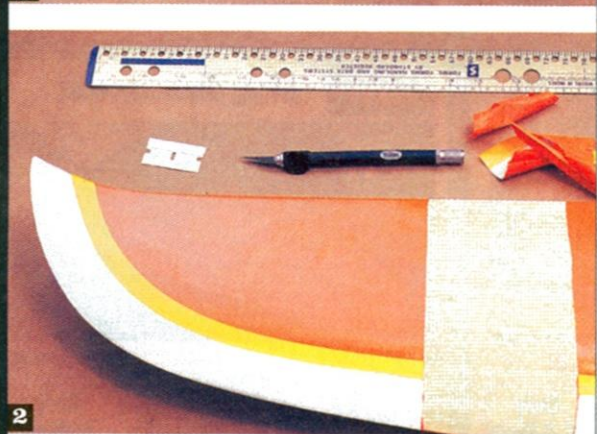
creased the sheeting on my high-performance Simprop SE-300 sailplane. On a high-performance wing, the foam-core defines the shape, and the thin wood sheeting strengthens and stiffens the structure. If this sheeting is damaged, the wing's strength is compromised. How do you repair a wood-sheeted, foam-core wing? Our first objective is to restore the wing's strength and stiffness; the second is to restore its appearance.



1
Here is the SE-300 less than a second before the crash that caused the damage. On a landing approach, a gust rolled the plane, and its right wingtip dug into the turf.



2



2



4



5

2 The crease doesn't look horrible, but it compromises the wing's strength.

3 Remove the film covering on and around the creased area. Light pressure with a sharp hobby blade will cut the film without further damaging the wood.

4 Cut thin strips of fiberglass cloth a little longer than the crease. For this repair, I used three strips: $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch wide. Remember, the fiberglass cloth provides the strength; the epoxy just secures it.

5 Apply epoxy to the layers of fiberglass cloth, using only enough to wet them thoroughly. A disposable epoxy brush is useful here. Keep in mind that excess epoxy adds weight but little strength, and it will add to your sanding task. Weight the wing to keep it flat (I used sandbags) and let it cure overnight.

6 The next day, trim the excess cloth off the leading and trailing edges with a sharp blade and, beginning with medium-grit sandpaper and progressing to a finer grit, sand the area. Sanding blocks come in handy for this job.

7 Apply a lightweight filler to ensure a smooth surface under the new film covering, and let it dry overnight. Carl Goldberg Products Model Magic filler and lightweight spackle both work well.



6



7

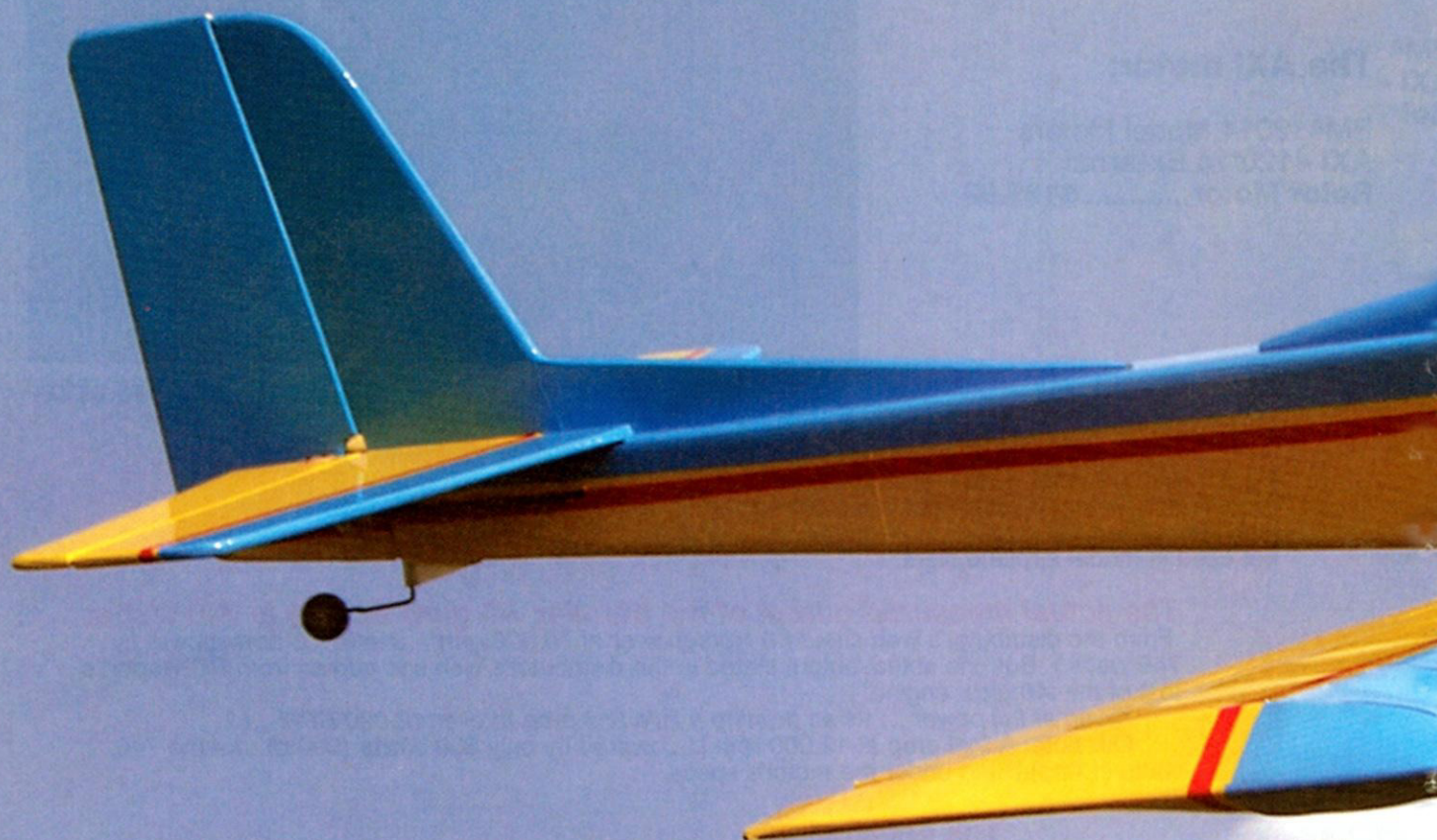


8

8 After sanding the filler and removing the sanding dust, apply more heat-shrink covering with a covering iron. Your level of craftsmanship will determine how good the repair looks, but the wing will definitely be stronger than it was with the creased upper skin. ✚



Here I am with the repaired wing, ready for the next flight session. Now, that wasn't too painful—right?



Pronto Supreme



A classic low-wing sport trainer reborn!

MANY YEARS AGO, I DESIGNED A NEW TYPE OF SPORT MODEL. The Pronto was a low-wing, 3-channel model with substantial dihedral and a flat-bottom airfoil; it was powered by a .15 glow engine. The plans were published in the August 1972 issue of *Model Airplane News*, and it was kitted by Tidewater Hobby Enterprises. The Pronto struck a chord with sport fliers, who built and flew quite a few of them during the next 25 years.

Remembering this design and its departure from the conventional models of the day, I revisited the concept with a view to incorporating modern power and controls. I added ailerons to the new version (I revised the airfoil to use a well-proven semisymmetrical section). Engines are now larger, so the new model was designed for a plain-bearing .25 2-stroke glow engine.

process. I use an O.S. FP .25 engine, and a JR micro-receiver and airborne system provide control. A 350mAh NiMH pack provides ample power without adding much weight. I used economical, sturdy, wooden mount beams for the engine to better distribute vibration and loads.

Made of regular-weight balsa, the Pronto Supreme's ready-to-fly weight is barely 2



The wing panels are built separately and then joined by a dihedral brace.

For simplicity, I retained the open-frame wing structure. I simplified and strengthened the fuselage structure and reshaped the tail surfaces to give them a modern look. It became apparent that a name change was also in order, so it is now the Pronto Supreme.

I incorporated several features to reduce drag. The landing gear is now attached to the wing, and I cleaned up the wing-to-fuselage attachment by eliminating the rubber bands. Tapered-strip ailerons blend into the airfoil to further reduce drag. Construction goes quickly, and MonoKote speeds the finishing

pounds—quite a surprise! Have I convinced you to build one? Great! Let's move on.

▶ **Wing construction** Build the wing first. I prefer to slice my own spars out of sheet wood so that they will be well matched in density and strength. A commercial balsa stripper does a fine job. Make the spars, the trailing edges and the aileron assemblies, and then trim them to shape. Since the wing ribs are all the same shape, cut a batch of blanks and pin them together to form two stacks. Trace the rib pattern onto both stacks, and use a jigsaw to cut all the ribs out at once. Once separated,

SPECIFICATIONS

WINGSPAN: 51 in.
WING AREA: 418 sq. in.
WEIGHT: 2 lb. dry
WING LOADING: 11 oz./sq. ft.
ENGINE: O.S. FP .25 2-stroke
PROP: Zinger 9x5
RADIO REQ'D: 4-channel (rudder, elevator, throttle, aileron)
RADIO USED: JR R610M 6-channel micro-receiver with 4 NES 241 microsensors and a 350mAh, 4.8V NiMH receiver pack

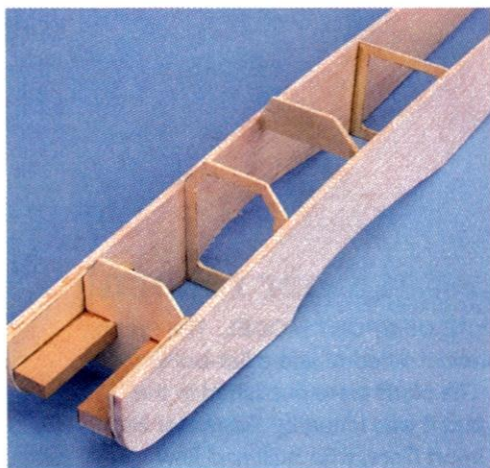
the individual ribs can have the extra notches cut into them.

With the trailing edge and aileron strip pinned to the plans, position the bottom spar and pin it into place. Now glue the ribs into place and then glue in the top spar. Glue the shear web sheeting and the leading edge into place, and then do it all again to make the second wing panel.

Remove the wing panels from the building surface and add the landing-gear blocks and

COMMENTS

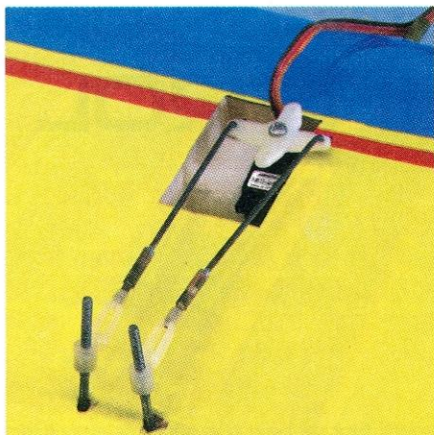
Designed by Dave Robelen, the Pronto Supreme is a high-performance low-wing sport model with unique styling. The relatively high top speed allows it to be at home flying in calm conditions and in moderate winds. It is capable of all typical AMA aerobatic maneuvers. Although smooth with no bad habits, its high top speed combined with its neutral stability would make it a better choice for pilots who have experience flying planes with ailerons.



Join the fuselage sides with the formers.

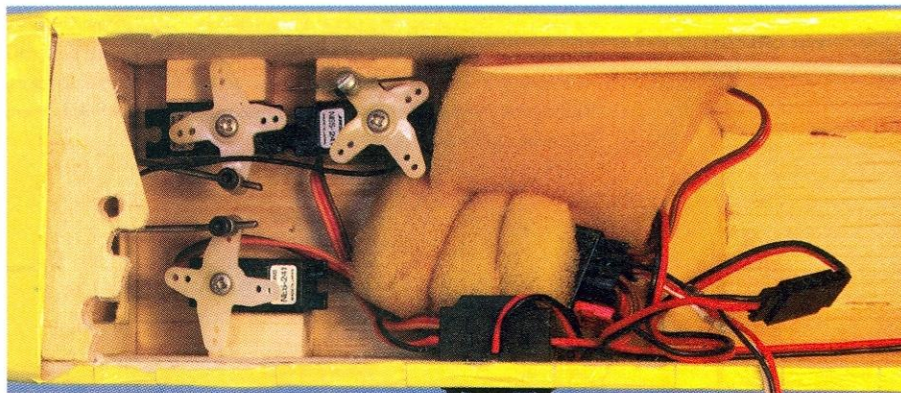


The completed fuselage is shown here with the headrest and nose top sheeting in place.



The aileron-servo installation showing the control linkage in place.

the wingtip plates. Carefully fit the center wing joints so that all of the spars and the edges make good contact at the proper dihedral and glue them together; I used medium CA. Glue the two aileron strips together now, too. Cut through the center ribs with a hacksaw blade to create clearance for the dihedral brace, and then glue in the brace.



Radio compartment with micro-receiver and servos in place.



Engine installation is straightforward and uncomplicated.

CLASSIC DESIGN

AUTHOR AND MODEL AIRPLANE DESIGNER

Dave Robelen has been around for a very long time, and back in the early '70s, he published his first Pronto design. The 3-channel, .15 Pronto (FSP08772) was a very popular *Model Airplane News* design; many models were built and flown from Dave's plans. We're sure Dave's new Pronto Supreme will become another all-time favorite. When it comes to good flying model designs, it's good to know that some things never change!



ailerons to the linkage and glue on the plywood wing-bolt plate.

➤ **Fuselage** The fuselage is really quite simple. Pin two sheets of $\frac{3}{16}$ -inch balsa together; use the plans' pattern to mark the outline, and run them through the jigsaw. More cutting and marking produces a set of lite-ply doublers and the maple engine-mount rails. Position the two rails carefully so that the engine's attachment lugs make full, even contact with them. Then join the two fuselage sides with the lite-ply bulkheads and keep everything square. I chose to score the inner surfaces of the sides behind the rear bulkhead so that they would form a straight line all the way to the tail post. Medium CA applied to the score lines after the tail ends have been pulled together ensures adequate strength. I also added a couple of cross-braces to support the top and bottom sheets and to prevent them from bowing in.

Mate the wing to the fuselage and drill the hole for the front-alignment dowel through the leading edge. I used a length of brass tube for the alignment dowel, and it works fine. I waited until I had covered the wing to glue this dowel in the leading edge and then added the bottom sheeting. Clamp the wing to the fuselage; then drill and tap the wing-mounting block for the attachment bolt.

Form the nose top using three, $\frac{3}{16}$ -inch-balsa planks. Fit and glue the side pieces first and then add the top piece. A sharp knife and sandpaper will produce a clean-looking nose. It's up to you if you want to add the headrest, windshield, etc.; I think they add a lot of character. Cut the tail surfaces out of flat, $\frac{3}{16}$ -inch balsa. Sand the edges and join the elevator halves as shown on the plans. Now cover all of the airplanes' parts.

After I had covered everything with MonoKote, I clamped the wing into place and used it to line up the stabilizer. The fin was next, and then I hinged all the surfaces

using fuzzy CA hinge material. Cut the hinges about 1/4-inch wide before you glue them into place. Attach the control horns; fit and hinge the ailerons, and you've almost finished.

► **Final Assembly** After checking thoroughly for leaks, I installed the fuel tank. The engine came next; I used no. 4 sheet-metal screws threaded into the mount rails. I then bent the landing gear to shape and used simple plastic straps to attach the gear and hold it securely. I used a Carl Goldberg Products tailwheel bracket with 1/16-inch music wire to make the tailwheel assembly. Several layers of MonoKote keep its tiller arm nicely attached to the rudder.

I installed my servos with double-sided servo-mounting tape, and I have never had a problem with them coming loose. I glued a patch of 1/4-inch plywood to the balsa and bonded them to it. The pushrods are lengths of simple 3/16-inch-square balsa with 1/16-inch-wire ends. The throttle linkage is a 1/32-inch wire snaked through thin plastic tubing. A

plastic ball link at the carburetor arm prevents metal-to-metal contact. Now go back over your work and check for loose and/or weak joints.

► **Flying** On the first flight, the Pronto Supreme shot through the tallish grass of the flying field and took to the air like a scalded cat! The trims required small tweaks for straight and level flight, and we were ready for some aerobatics. After about 10 minutes, it was clear that there was no standard maneuver—upright or inverted—that the Pronto Supreme could not handle with ease. Complex loop and rolling maneuvers are a piece of cake! Its top speed is about 70mph,

and this baby is not scared of the wind! The glide is smooth on approach, and 3-point landings are easy.

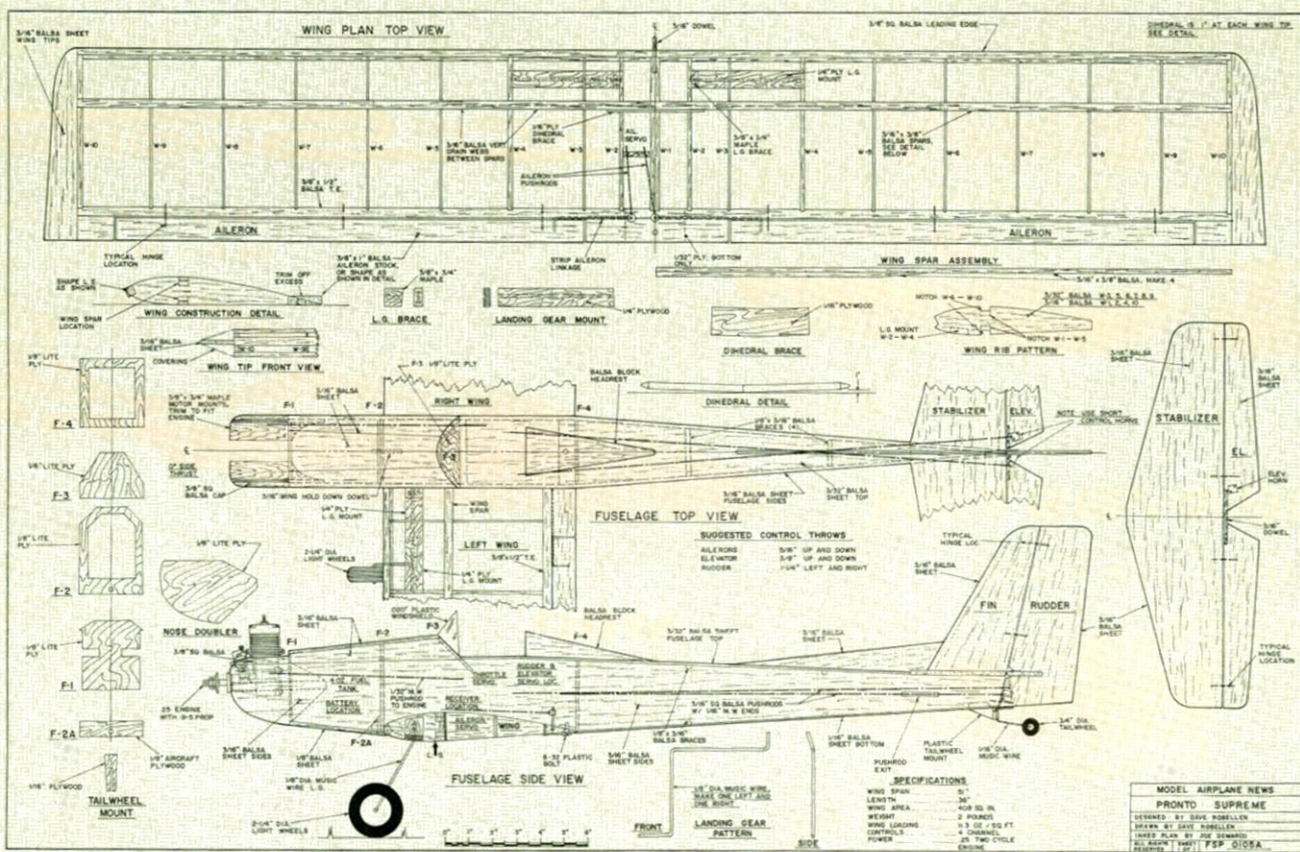
The Pronto Supreme is fast at full throttle, remember this during your first flight! Takeoffs don't require any unusual techniques; just point it down the runway and slowly throttle up. Throttle back a bit and trim for straight and level. If your aileron trim is off at all, the wing may be warped. Bring it in and take a good look along both wing panels and correct the warp if necessary. The real fun is using the throttle to maintain a more constant speed in flight. Enjoy! ✦

Addresses are listed alphabetically in the Source Guide on page 174.



PRONTO SUPREME

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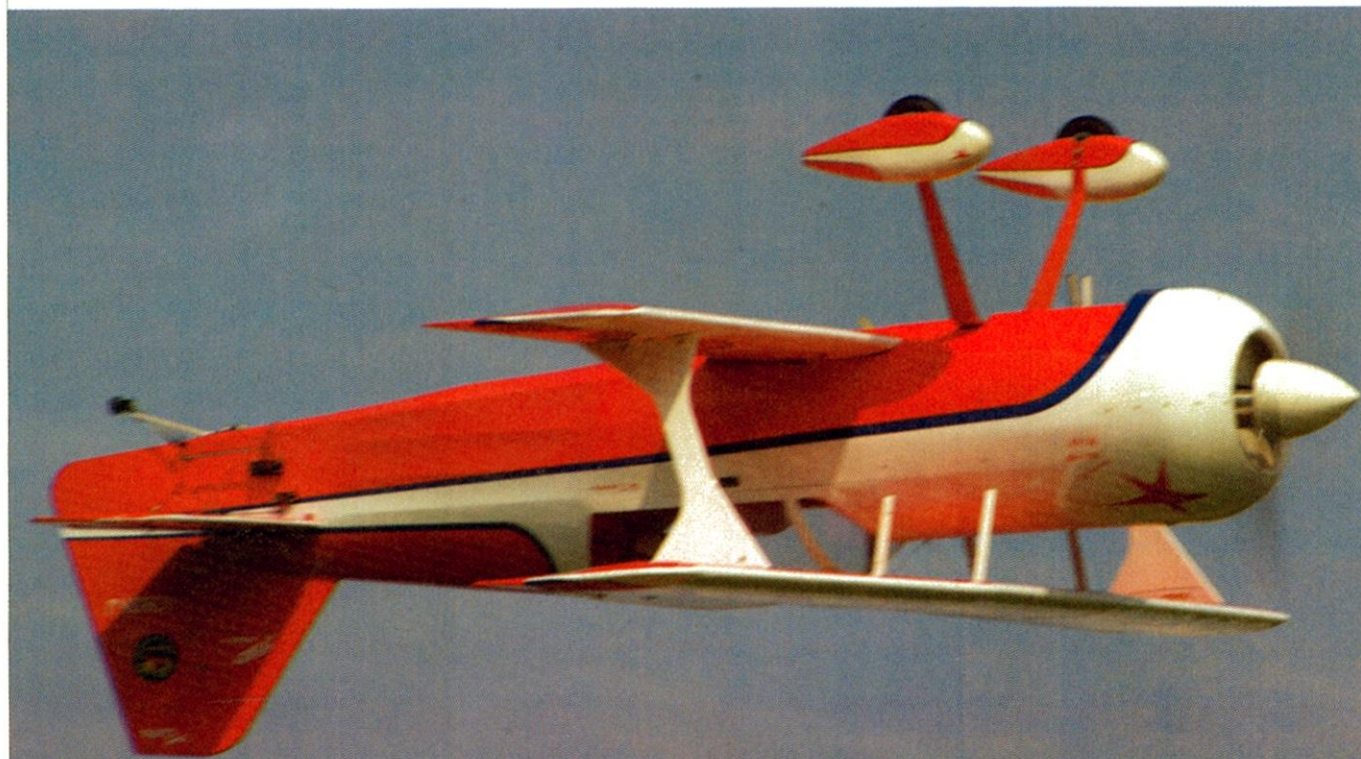
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CAD: FROM 3-VIEWS TO PLANS

BY GERRY YARRISH ▶ PHOTO BY JERRY SMITH



This 41-percent Pitts Model-12 biplane designed by Bob Trueworthy of Bigairplanes.com is a great example of a CAD-designed model. It has a 108-inch span and is powered by a 150cc gas engine. Thanks to the flexibility of CAD, Bob offers a smaller version of the same design.

THE NUMBER OF CAD-DESIGNED MODELS on the market today is amazing. The days of developing specific tooling and dies to cut kit parts are all but gone; these processes are being replaced by laser cutting and CNC machining. Modelers also use their PCs to draw their scratch-built beauties. In the September issue, I talked about using CAD and the basic drawing tools included with it. Several readers had questions, and I address some of them as we look more closely at the techniques used to transform scale 3-view drawings into construction plans!

PLAN DEVELOPMENT

At this point, I assume that you know how to use your CAD program and can create the basic geometry needed to develop model plans. I also assume that you have chosen a 3-view drawing and have scanned it into an electronic image file. This is where the fun begins!

CHECKING 3-VIEWS

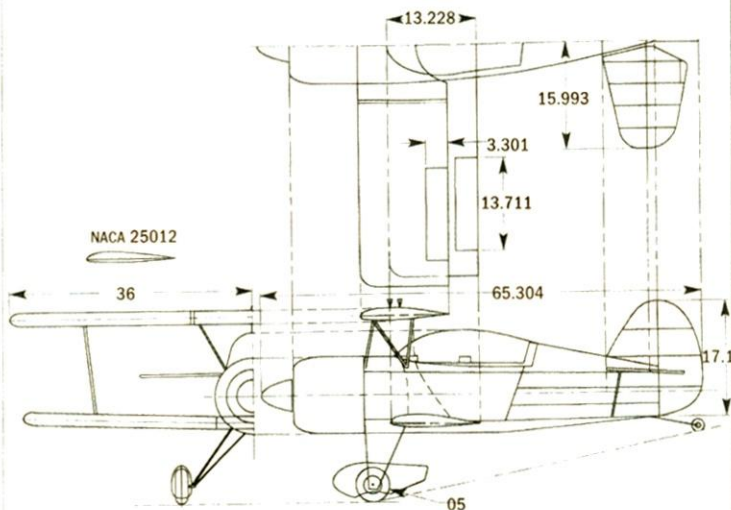


FIG 1 This is my CAD drawing of a 72-inch-span Pitts Model 14. Reference lines are shown to match up height, width and length of the top, side and front views.

WING DEVELOPMENT

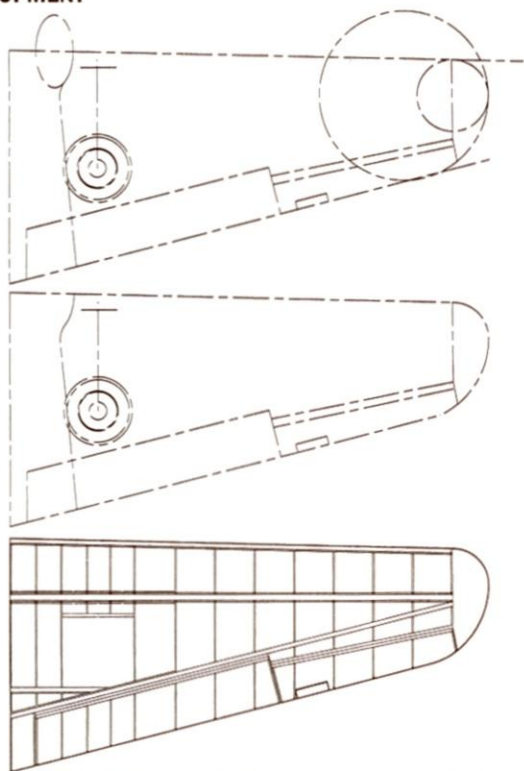


FIG 2 In this wing-development drawing, you can see the three basic steps. First you trace your drawing using basic geometry, and then you delete unwanted segments, and finally, you add the internal details. Everything is done in full-size.

FUSELAGE REFERENCE LINES

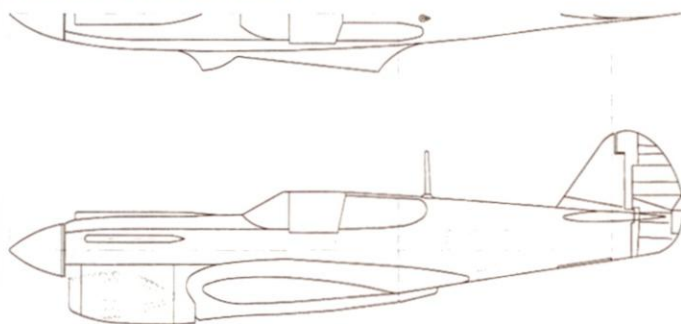


FIG 3 The fuselage side view and half top view are used to determine the height and width of the fuselage cross-sections. The reference lines show the cross-section locations.

FORMER DEVELOPMENT

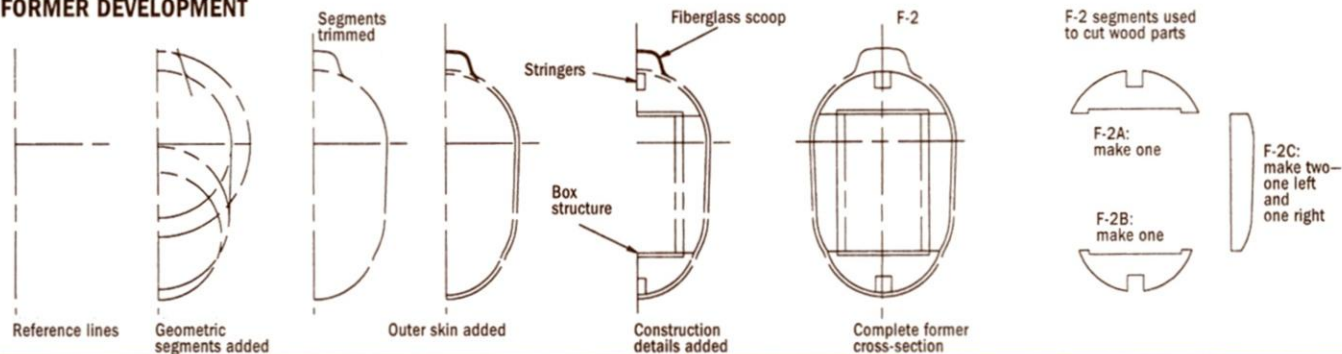


FIG 4 Here's the development of a basic fuselage cross-section and the finished former.

The process always begins with importing your image file and saving your CAD document. Next, use the zoom function to enlarge the fuselage side view to the width of your screen. Draw a centerline through the middle of the prop shaft, and extend it to the tail. Now trace the fuselage's long gradual lines using the curved-line or "Spline" tool. Also, wherever possible, use the Circle and/or Ellipse tool to create crisp, well-defined curves. Do the same for the top views of the fuselage and horizontal stabilizer. Now trace one wing panel; note that most of the lines are drawn with the Straight Line tool. Usually, the wingtip will be the only place requiring curved lines. Finally, trace half of the fuselage front view.

From here, you may be tempted to begin adding formers, ribs and other internal details, but wait! There's one more thing to do. Compare the side and top fuselage views and make sure that they are the same length and that the wing and stabilizer locations coincide. If they don't, decide which view is correct and adjust the other view to match. Also check the wing and stabilizer top views, and make sure that they match their placement in the fuselage side view. More times than not, there will be minor discrepancies in even the best-drawn 3-views. Before adding any internal details, make sure that your basic top-, side- and front-view elements all match in height, width and length!

DRAW TO FULL-SIZE

Once everything matches, but before you draw the various reference lines, use the Enlargement tool to adjust your drawing to the size you want your plans to be. The most obvious dimension to use here is the wingspan. Once you have enlarged your drawing, save the file. Also save a copy of the file and use it as a backup in case something happens to your original.

From here, you can add internal details and draw them in full scale. In the Wing Development drawing, you can see that I have drawn a P-40 Warhawk wing panel using straight lines for the leading and trailing edges, and I used the Circle tool to develop the wingtip's shape. Since the drawing is full-size, I added a $\frac{3}{8}$ -inch-wide leading edge, an $\frac{1}{8}$ -inch sub-leading edge, a $\frac{1}{2}$ -inch-wide main spar, a $\frac{3}{8}$ -inch-wide secondary spar and $\frac{3}{32}$ -inch ribs. Servo and landing-gear details have also been added—all in full-size. All that would be

required now is to develop the airfoil and to size it using the wing top view as a guide to develop all the ribs.

“... work only on one side of the centerline and use the Mirror Image tool ...”

FORMER DEVELOPMENT

To accurately develop former shapes, it is important to start with a scale drawing that has at least a few of the main fuselage cross-sections shown. Begin with the top view (horizontal) and side view (vertical) reference lines and their relative positions to the fuselage centerline. Now combine the reference lines to form the overall height and width of the cross-section's front view. Next add the basic geometric shapes and trim away any unwanted parts. What's left is the outline of the cross-section. To define the former, add an offset line inside the outline to represent the thickness of the fuselage sheeting—typically, $\frac{1}{8}$ inch. Now you can add the internal structures such as stringers and doublers. Define the former segments and again, delete any unwanted lines to show the finished former. Do this for all the cross-sections. To develop any additional formers, you have to do some plotting using the known cross-sections as a guide. But I'll show how to do that next time! Remember my CAD rule: work only on one side of the centerline and use the Mirror Image tool to complete your symmetrically shaped parts.

Developing your model-design skills is all part of the fun and challenge of using a CAD program. Until next time, grab that mouse and keep on practicing. ✦

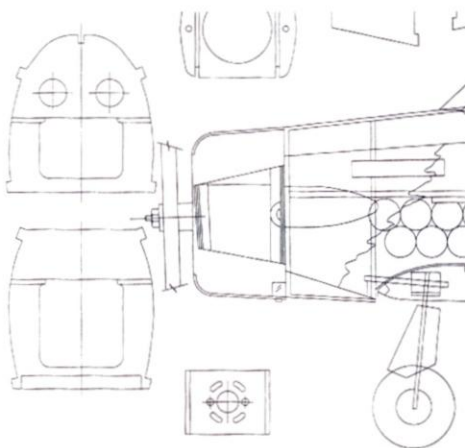
Addresses are listed alphabetically in the Source Guide on page 174.

FILE CONVERSION

SO FAR, I HAVE DESCRIBED HOW TO use CAD to trace over your imported image file to produce your plans' geometry. A great way to speed this process and to eliminate tracing errors is to convert your image file directly into a CAD file. An image file such as a bitmap, TIF, or JPG, etc., is made up of many tiny black and white dots, or pixels, and is saved as a raster file. CAD documents are saved as vector files, and they contain the "X" and "Y" coordinate information (start and stop locations) for all the line elements in the drawing. You can use a conversion program, or you can send your scanned image to a company that offers a raster-to-vector conversion service.

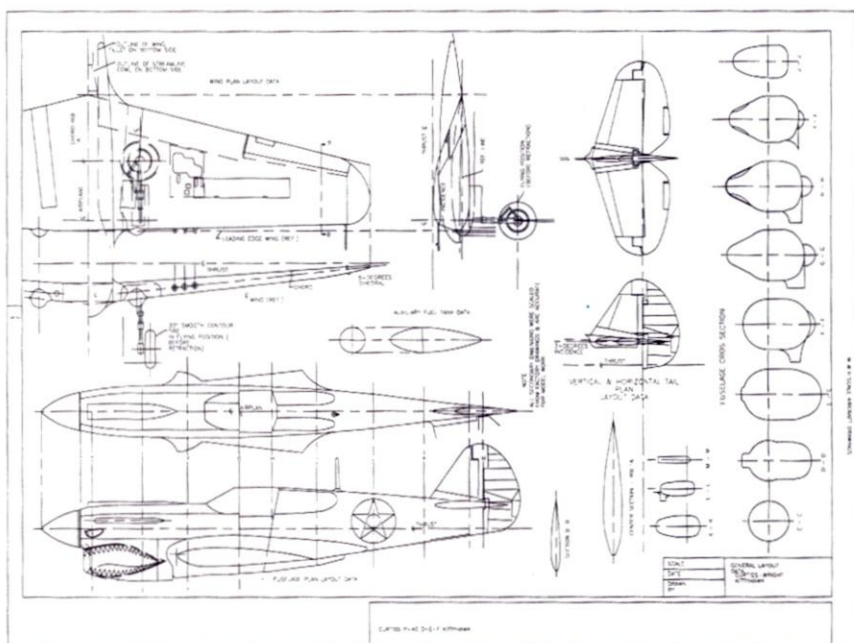
DesignPresentation Associates offers a raster-to-vector conversion service, and I have used it several times. This company can take any hand-drawn

sketch or scanned image and convert it into any other type of file that you may want. For our situation, that would be either a .DWG or a .DXF format. Simply scan your drawing, send your image file via email and, in a very short time, you'll receive your vector file ready to be imported into your CAD program. Once it's imported, you can save the file and enlarge it to the drawing size you want. The service costs about \$50 for a standard, single-page, 3-view conversion, but considering the time this service saves, it's a great investment. You can check out what DesignPresentation Associates has to offer at designpresentation.com, or you can email Gene Kang and ask for a quote: gene@designpresentation.com. Give Gene a try. I know you will love the results.



This is a small section of a set of plans that was converted from a raster to a vector format. DesignPresentation Associates did the conversion in a day.

This converted Wylam P-40 Warhawk scale drawing is another example of DesignPresentation's raster-to-vector conversion service. It represents a big savings in drawing time!



Finish a Warbird

TAMIYA SPRAY PAINT MAKES IT EASY > BY DAVE GARWOOD

THERE ARE TIMES WHEN only a painted finish will provide the results you want for a special model airplane. The main reason to finish a scale plane with paint rather than iron-on covering is the opportunity to use the larger number of colors available, as accurate color matching greatly enhances the scale appearance. Paint can also create a matte finish and allows a "feather edge" between camouflage colors—not too sharp, not too fuzzy.

EPP-foam slope warbirds are looking better and better these days, with bulkier, closer-to-scale fuselages and narrower wing chords than previously seen. When you build a design that looks good and flies well, it's worth some extra effort on the final finish. This is an account of how four glider builders used spray paint in rattle cans to finish their slope-soaring warbirds, and how you can do the same.

Joe Chovan, Jack Cooper, Rich Loud and I built Leading Edge Gliders' Curtiss P-40 Warhawk kits and finished them in an American Volunteer Group "Flying Tigers" scheme using the new Tamiya Color Spray for Aircraft. The kit and the paint fulfilled our requirements splendidly. Because we planned to meet and fly our squadron at the Midwest Slope Challenge at Wilson Lake, KS, we nicknamed this the "Warhawks over Wilson" (WoW) project.



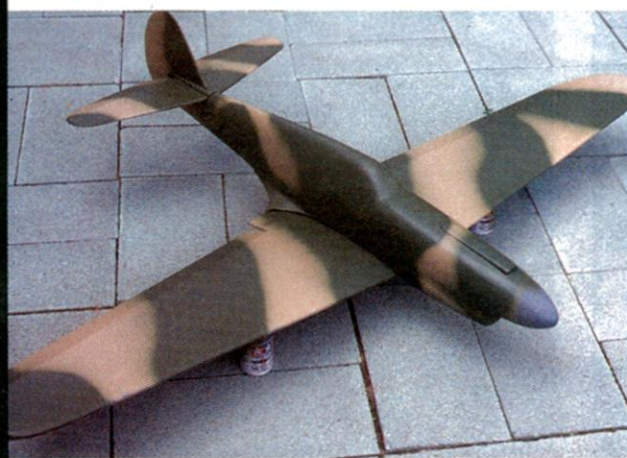
Dave Garwood's
P-40 Warhawk
over Wilson Lake dam.



1
Leading Edge Gliders' P-40 Warhawk with EPP-foam carving work done, covered with Solartex heat-shrink fabric and ready for primer paint.



2
Covered with Solartex and sandable primer.



3
Main paint colors applied with rattle cans—no masks.



4
Main paint colors applied with rattle cans; cleaned up with airbrush.

ON THE BENCH

After we built the airframes, we applied light spackle to fill the small gaps in the foam, final sanded and then covered the planes with Solartex iron-on fabric. Solartex is tough and resilient; we've used it for years on slope planes that take a beating landing on rough terrain. To enhance your airframe's adhesive qualities, coat it lightly with 3M 77 (an aerosol contact cement) before you iron down the fabric.

Next, we sprayed three or more coats of Krylon sandable primer to fill the Solartex weave and wet-sanded after each coat. When these had dried thoroughly, we applied the base color coats: light gray on the bottom and tan on the top. The Tamiya paint went on very smoothly and covered the primer paint well.

The green camouflage markings were next. To get the proper feather-edge boundary between tan and green, we tried three methods. The first was the one described by West Coast associate editor John Reid in the May 2004 issue of *Backyard Flyer*: he cut cardboard templates to shape and held them slightly above the surface to be painted. For the next method, we sprayed the green paint on "freehand"; this works well if you have a steady hand and can accurately gauge your distance and speed. Third (and the method I used), we laid down most of the paint freehand and then touched up the overspray with an airbrush. As I examined the varied results when we all arrived in Kansas, I liked the looks of Rich's cardboard-template spray-can results better than my own airbrush technique because his coverage was more even. We achieved scale results with all three methods.

We masked and spray painted the remaining markings: canopy, spinner, exhaust stacks and fuselage numbers. Our conclusion? The new Tamiya Color Spray for Aircraft is an excellent finishing material and will make good-looking military camo finishes easier than ever to achieve. Jack Cooper, the most prolific builder in the WoW group, said he likes the Tamiya paint better than any other he has used.

Masking the spinner. Primary colors often look brighter with a base of white paint under the color coat. Cover the non-spray areas to prevent overspray from getting on them.



This mask around the canopy keeps overspray off the fuselage. The white tape is a special low-tack type that reduces the chance of the color coat being pulled off when the tape is removed.



Rich Loud uses the cardboard-stencil method to mask his camouflage markings. Here, he sprays green on a wingtip directly from the rattle can, a method described by Air Age West Coast associate editor John Reid in a recent issue of *Backyard Flyer*.



The stencil and spray-can method yielded excellent results on Rich's green tip. For this project, I liked the looks of Rich's direct-spray-can method better than my own airbrush technique.



HINTS AND TIPS

1. Allow plenty of time, and work deliberately—especially on the small, masked-off paint areas. Most mistakes can be fixed with a brush or toothpick application of more paint, but this generally takes more time than doing it right the first time.
2. Newspaper isn't the best choice for masking areas that shouldn't receive paint; the ink rubs off on your hands and onto the plane. Brown wrapping paper was a WoW favorite.
3. Watch out for aggressive adhesive on the stencil and other masking materials. The cut-vinyl stencils are very sticky, and when I used a new brand of frisket that was stickier than I was used to, it pulled some acrylic paint up after both had been applied for only 24 hours. I had no problems with Pactra thin masking tape or "low-tack" frisket. Carefully applying talcum powder can cut down the adhesive's aggressiveness, but be conservative; it's easy to use too much powder and lose all the glue.
4. If you're in a time crunch and decide to use an airbrush, you can substitute Tamiya acrylic paint in jars for the Tamiya AS and TS paint in cans (acrylic paint dries more quickly than lacquer or solvent-based enamel). Also note that flat paint dries faster than glossy.
5. Consider making one or more practice panels to test the spray-can pattern and coverage. It also helps to check the performance of masking materials, as well as to practice with brush and frisket for painting small details like the shark's teeth.
6. Don't forget panel lines, as they really dress up the plane with very little extra work. I use a Sanford Ultra Fine Sharpie marker, a flexible plastic ruler and plastic templates. Mistakes can be cleaned up with isopropyl alcohol.
7. When you need to extract paint from spray cans for airbrushing, remember to do so carefully because you're dealing with pressurized materials. Here's a method that has worked for me: shake the can thoroughly and let it rest inverted for a few minutes. Holding the can inverted, depress the spray nozzle until all the propellant has been released. Wearing eye protection, secure the can in a vise (still inverted) and cover it with a rag. Drive a nail through the rag to punch two holes opposite each other on the bottom of the can. Pour the paint out of one hole into a suitable clean container (the second hole allows air to enter the can and enables smooth pouring). I airbrushed with the Tamiya spray paints without thinning them, but if necessary, the paint can be thinned with automotive lacquer thinner.
8. Don't be too hard on yourself if your paint job isn't perfect. Remember, plenty of full-size warplanes have been painted and repainted in the field under adverse conditions. Little mistakes that seem huge on the bench are often not noticeable in the air.



Frisket film is applied to the underside of the wing, and the tire-marking areas are cut out with a special compass that holds a blade.



To make the tire markings, apply semigloss black paint directly from the can.



The tire markings look pretty good, along with the completed panel lines and decals. Panel-line tools include green plastic templates, a Sanford Ultra Fine Sharpie marker, rulers and the Squadron/Signal "Curtiss P-40 in Action" book with 3-view drawings for reference.

HOW IT HOLDS UP

After many landings (some of them spectacularly rough), we noticed that the paint had chipped off in areas where the resilience of the EPP foam had allowed the plane to deform and then spring back to shape. As I examined the accumulated damage at the field, I began to think that the Krylon primer—not the Tamiya paint—was showing limited flexibility. When I returned home, I experimented to see which of these materials best withstands impact and abrasions:

continued on page 172

P-40 AVG SQUADRON COLORS

Krylon 1318 All Purpose Primer Sandable Primer Gray
Tamiya AS-2 Light Gray (IJN) for underside
Tamiya AS-9 Dark Green (RAF) for upper side
Tamiya AS-15 Tan (USAF) for upper side
Tamiya TS-10 French Blue for canopy
Tamiya TS-20 Insignia White for "68" numerals
Tamiya TS-49 Bright Red for spinner and shark's mouth
Tamiya TS-29 Semi-gloss Black for shark's mouth
Tamiya TS-26 Pure White for shark's mouth and eyes

For the Tamiya TS color chart, go to:
tamiyausa.com/product/paints/images/ts_color_chart.jpg
For the AS color chart, go to:
tamiyausa.com/product/paints/images/aircraft_chart.jpg



I experimented to find out how to reduce paint chipping on the flexible EPP-foam plane. This is the after picture.



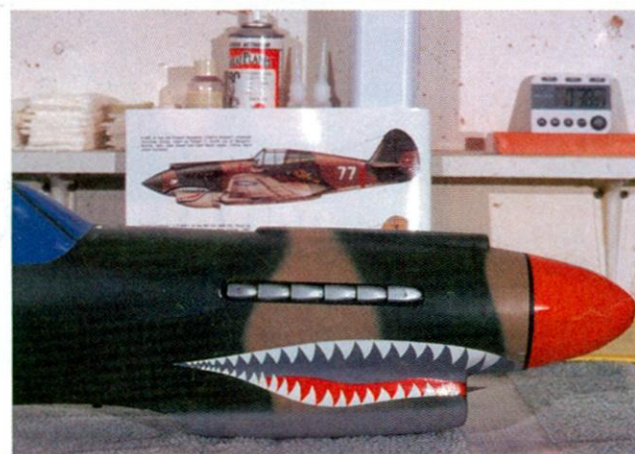
1 After the main camouflage colors had been applied and the canopy and spinner were painted, I sprayed on the white paint for the teeth and used tape to mask.



2 Frisket is applied over the white paint after it has dried thoroughly. The Sharpie marker writes well on the frisket as a cutting guide. Frisket is easy to cut with a hobby knife that has a fresh blade.



3 Medium-gray paint has been applied and the frisket removed.



4 Red paint has been applied and the frisket removed.

EASY PAINT MASKS

Frisket is a specialized adhesive film to mask sprayed paint; it's available from art-supply stores or by mail order. One dependable source is Dixie Art and Airbrush Supply (dixieart.com). The essential characteristics for our purposes are that the material is impermeable to sprayed paint, readily sticks to already-painted surfaces, pulls up cleanly without removing underlying paint or leaving a residue and can be cut sharply and easily with a razor blade.

Frisket film is sold in sheets and rolls and is available with a shiny or matte working surface and with high- or low-tack adhesive. I prefer low-tack matte film; it lays out well on flat and single-curve surfaces, but its ability to mask surfaces with compound curves is very limited. For compound curves, try liquid masking film or Testors Model Master Parafilm masking material.

For the shark's mouth on my Warhawk, I used Grafix Prepared Frisket Film (low-tack, matte-finish, 0.002-inch vinyl). When painting small areas such as the shark's mouth, I can work far more accurately with a hobby knife than I can with a brush. You can draw on the frisket with a Sharpie marker to make a cutting guide; if you make a mistake, it's easy to pull the frisket off and start again with a new piece.

If you're new to frisket, start with something simple, such as the tire markings on the underside of the wing. I laid out the markings with a pencil compass after drawing some of the major panel lines with a Sanford Ultra Fine Sharpie marker. Then I applied frisket to the underside of the wing and cut out the tire-marking areas with a special compass that holds a blade (also available from an art-supply store).

I masked off the rest of the wing and left only the tire-marking areas exposed; then I took the wing outside and lightly sprayed semigloss black paint directly from the can onto the exposed areas. When the paint had dried, I applied the decals and completed the panel lines using a Sanford Ultra Fine Sharpie marker, rulers and plastic templates after referring to the 3-view drawings in the Squadron/Signal "Curtiss P-40 in Action" book.

Painting the shark's mouth was a little more involved. After I had applied the main camouflage colors and painted the canopy and spinner, I applied a tape mask and painted the teeth white. After the white paint had dried thoroughly, I covered the area with frisket and used a Sharpie marker to draw a cutting guide and used a hobby knife to remove the areas that would receive the gray paint. Be sure to use a fresh blade so you can cut precisely and with minimum pressure. I sprayed it with medium-gray paint, removed the frisket and let the paint dry overnight.

The red paint was next, and I applied it with a frisket mask just as I had done with the gray paint. Last, I added the black markings around the shark's mouth with a Sharpie marker (you could also use a frisket mask).

If you want the details of your planes to look sharp, frisket will quickly become another arrow in your quiver of techniques.

- Tamiya spray paint directly on Solartex (no primer).
- Krylon primer, then Tamiya spray paint.
- Tamiya primer, then Tamiya spray paint.
- Adhesion promoter, Krylon primer, then Tamiya spray paint.
- Special flexible primer for automobile bumpers, then Tamiya spray paint.

I painted a test-block of EPP foam and then repeatedly bashed it into a concrete curb edge until differences in the impact resistance of the combinations were apparent. Tamiya paint sprayed directly on Solartex without any primer is the most able to withstand damage; the combination of

Krylon primer, then Tamiya spray paint is the least able to resist abrasion. The other combinations performed between these two extremes and exhibited few differences among them.

These results will not matter to those whose models have landing gear and to pilots who always land shiny-side up. Rigid fiberglass models will also resist paint chipping when compared with flexible foam models. Rough-and-tumble slope pilots may consider foregoing the weave-filling applications of primer and simply apply the Tamiya paint directly to the Solartex. ✚

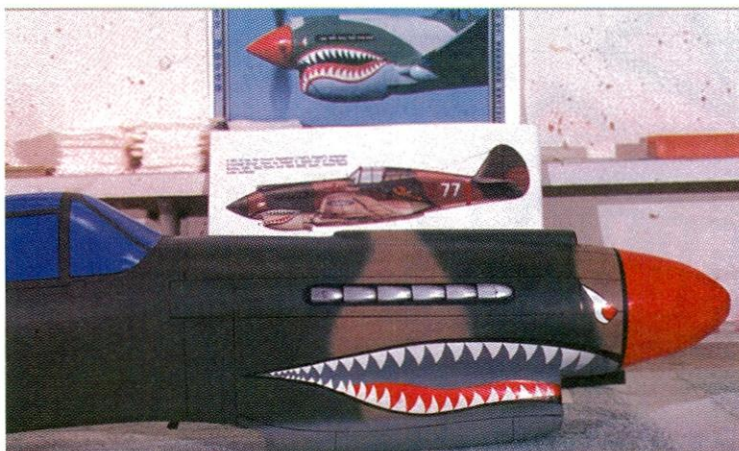
Addresses are listed alphabetically in the Source Guide on page 174.

THE BOTTOM LINE

After we had flown the planes together in Kansas, the WoW project team met to compare experiences with the Tamiya spray-can paints. Our findings:

- ✚ Good coverage (although Bright Red needed more coats than the other colors).
- ✚ The sprayed paint strongly resists running. No runs at all were reported.
- ✚ A wide selection of colors is available, and the applied colors look great.
- ✚ The paint—especially the matte colors—dries fast.
- ✚ Excellent spray pattern from the rattle can. Tamiya has done a lot of R&D on the packaging, including the nozzle, and it has paid off.
- ✚ Strong lacquer smell; best sprayed outdoors.
- ✚ For some applications, too much paint comes out on a spray pass.

We also agreed that we'd like the option of buying larger spray cans as well as matching paint in jars for use in an airbrush.



4 Black has been added around the shark's mouth with a Sharpie marker, but it could be painted using frisket mask if you wish. The shark's eye has been added and the panel lines completed.



My EPP-foam Leading Edge Gliders' P-40 Warhawk with Tamiya paint, decals and panel lines—ready for action!

AeroWorks (303) 366-4205; aero-works.net.
APC Props; distributed by Landing Products (530) 661-0399; apcprop.com.
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Tamiya America Inc. (800) 826-4922; tamiyausa.com.
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Wildcat Fuels (859) 885-5619; orders only (888) 815-7575; wildcatfuel.com.
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BACK ISSUES, MODEL MAGAZINES 61 Coach, Glastonbury, CT 06033-3237; davidbrown46@cox.net. [3/05]

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WANTED: A COMPLETE SET OF PLANS (5 sheets) for Richard Barron's classic Boeing Stearman 96? in wingspan PT-13. I recently bought this model 80% completed and want to finish building it. Gerald L. Norway, 189 S. 2nd Street, Fulton, NY 13069; (315) 593-8045. [2/05]



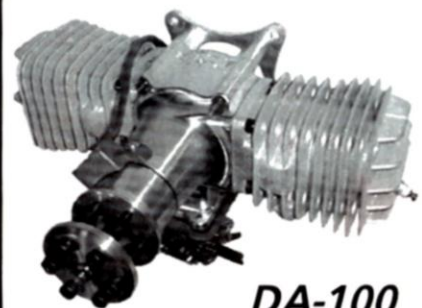
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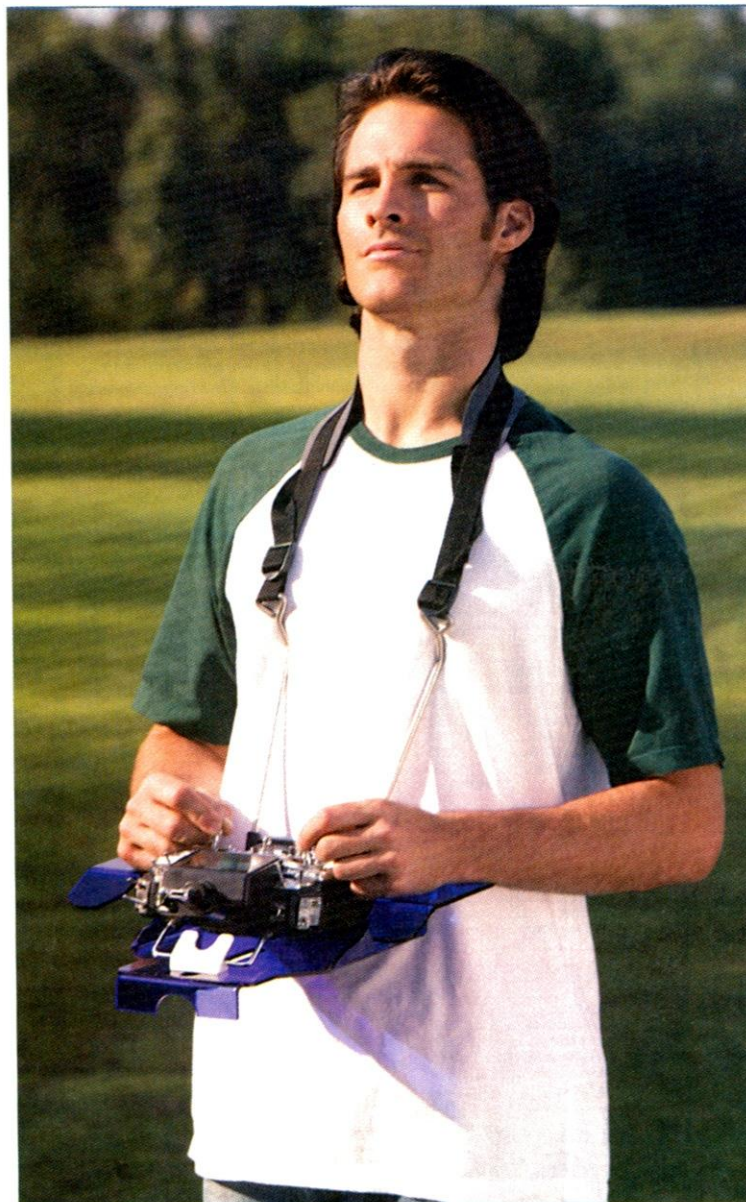
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RCA Models

TxTray

Take your flight control to the next level

European RC pilots are known to be very smooth fliers, mainly because they use transmitter trays. These trays have been slow to catch on in the U.S., but that may soon change with this cool-looking unit from RCA Models. It's constructed of durable acrylic and is available in many translucent colors, including red, blue, orange, yellow and bronze. The tray comes unassembled; you need only attach the metal rods to the base of the tray with a small adjustable wrench. The neck strap is attached to the rods and is easily adjusted to raise and lower the tray. A comfortable pad is sewn to the neck strap so it doesn't cut into the back of your neck. The transmitter is securely held on the TxTray by a very slick slide clip that can be adjusted to fit just about any transmitter on the market. Transmitter installation takes mere seconds; slide the clip to the top of the tray, insert the transmitter, slide the clip down over the transmitter's carrying handle, and tighten the oversize thumbscrew on the back of the tray.

When I use the tray for heli flying, my control inputs are more precise with less cross-controlling, and I feel more comfortable because I don't have to support the transmitter. The TxTray costs \$49.95 and is a worthwhile investment. —Rick Bell

RCA Models (248) 894-1934; rcamodels.com.

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The 56-page Albatros D.III Special (\$40) by Peter M. Grosz contains more than 130 photos, several sketches, six pages of 3-view drawings and 24 color profile views. Serious fans of the famous WW I German "V-strutter" should definitely have this Datafile Special in their reference libraries.

Alan D. Toelle's 80-page, Breguet 14 Datafile Special (\$42) is another great research and documentation source. It contains over 135 aerial and static ground photos, 12 color profile pages showing more than 30 Breguet aircraft, plus a rich collection of drawings, nose cowl styles, nomenclature stencil data, rudder legends and much more. From detailed photos of underwing bomb racks and machine-gun placements to rare engine and propeller views, this Special brings a seldom modeled French biplane to life.

If you are a serious scale competitor or just love to read about unusual aircraft, Wise Owl's Windsock Datafile Specials truly contain a wealth of technical and historical information! —Gerry Yarrish

Wise Owl Publications (562) 461-7574;
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Iron Bay Model Co.

Fuel regulator

Fuel when and where you need it

The Iron Bay fuel regulator may be the perfect solution to providing a consistent fuel flow to your engine. This system uses muffler or crankcase pressure through a one-way check valve to maintain a constant fuel supply, regardless of aircraft orientation.

This unit uses a Schrader-type valve along with a diaphragm that only permits the fuel to pass through during the low-pressure cycle within the carburetor. The regulator senses the suction through the carburetor and opens the valve, thus allowing the pressurized fuel to pass through. Many 4-stroke engines already have a crankcase vent fitting that can be used; to use the regulator with a 2-stroke, you'll need to install a pressure tap. Many engines have a solid boss on one of the backplate mounting screw bosses; you can drill through this into the case.

My test installation consisted of an O.S. 1.60 FX with a Bisson Pitts-style muffler and a fuel tank on the model's CG. I made a simple aluminum bracket and installed the regulator with the valve axis parallel to the crankshaft and didn't experience any sensitivity during high-G maneuvers.

To start the engine with the fuel regulator installed, I fully open the throttle and put the starter to the spinner for 2 or 3 seconds. I then close the carburetor to idle, place the glow igniter on the plug and flip the prop backward; the engine starts running at idle every time. The Iron Bay fuel regulator costs \$44 plus \$7 S&H.

—Mike Stroup

Iron Bay Model Co. (304) 232-7511; ironbaymodelcompany.com.



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Hal poses proudly with his latest endeavor.

“Rotary flight offers many new challenges to the RC pilot, and the autogyro is a great way to get involved in this type of flying.”

Autogyros

AN RC PIONEER'S NEW PASSION FOR WINGLESS FLIGHT > BY RICK BELL



The GyroPlane Pylon is simply bolted to the host model's fuselage.



As this 1995 photo demonstrates, Hal has brought new life to many models from the past.

ANYONE WHO HAS BEEN AROUND RC for a while will recognize Hal “Pappy” deBolt and his familiar corncob pipe. Pappy set many records flying free-flight models in the ‘30s and ‘40s and with control-line speed and stunt models in the ‘50s before he was bitten by the RC bug. Hal is a master of innovation and a fierce competitor. When he got into RC, he was a part of the leading edge of advancements, and he designed many planes—from trainers to high-performance pattern ships—as kits under the Live Wire brand. Today, those highly prized and collectible kits are regarded as among the best designs ever produced for RC planes.

Retired for many years, Hal has been concentrating on RC autogyros for some time. He continues to lead the field with designs and innovations that make flying autogyros easy and fun. His latest efforts have led to an introductory method for modelers who want to try their hands at this fascinating aspect of rotary-wing flight. All you need to do is find a suitable airplane and build the GyroPlane Pylon Assembly. This very simple, rotary-wing add-on pylon can turn almost any model into an autogyro. A .40 to .50 model is recommended, and minor kit bashing is necessary on the host model to make it suitable for rotary-wing operation. For rotor clearance, the vertical fin must be shortened and a sub fin added to the bottom of the fuselage to recover the lost fin area.

Also, 5 degrees of engine downthrust must be added. The neat thing about the GyroPlane Pylon is that you get a 3-in-1 model: a standard airplane, an autogyro trainer (a plane with a wing attached) and a true autogyro (no wing).

For this project, Hal used an old Midwest Star Duster low-wing sport model. Constructing the pylon is very simple; take the “Click Trip” to our website and download a full-size drawing and instructions for it. Also check out the link modelairplanenews.com/click_trips/jan03/rotary_wings.asp for a complete rotor-blade construction article. After you’ve built and attached the pylon, make sure that you follow Hal’s complete flight-trimming guide that’s also available on the website.

Rotary flight offers many new challenges to the RC pilot, and the autogyro is a great way to get involved in this type of flying without the expense and steep learning curve of a full-blown RC helicopter. Hal deBolt’s GyroPlane Pylon is unique because you can transition to rotary flight step by step with a model that you are comfortable flying and with minimal cost. Be warned, though: after you start, you’ll be hooked. Try one and see! ✦

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